

**APPLICATION
OF
PERFORMANCE BUDGETING
IN THE
CENTRAL PUBLIC WORKS DEPARTMENT**

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MARCH 1972

Price : Rupees Ten

PRINTED AT THE INDIAN PRINTING WORKS, RANI JHANSI ROAD, NEW DELHI-55.

Foreword

The Administrative Reforms Commission have recommended, and the Government of India have accepted, the need for introducing performance budgeting in Government. With a view to demonstrating the usefulness of the technique of performance budgeting and identifying the issues and problems likely to be encountered in the installation of the needed system, the Financial Management Unit of the Indian Institute of Public Administration undertook a study of the Central Public Works Department in December 1969. This was a new dimension to the role of the Financial Management Unit of the Institute in supplementing the efforts of the Government of India towards performance budgeting, training being the other area where effective contribution is being made.

The study of the CPWD covered an analysis of the objectives of the organisation, its structure, the prevailing administrative and financial powers and responsibilities at various levels, norms and standards prevalent, planning and execution procedures, the existing accounting and reporting systems, etc. Three representative divisions of the CPWD at Delhi were selected for this purpose, and as a result of detailed studies and discussions with the various engineer officers of the department, a report on the "Application of Performance Budgeting in the Central Public Works Department" was brought out in March 1971. This Report formed the basis for the very useful discussions that took place in the Seminar which was organised at the IIPA on the 6th and 7th of May, 1971.

While inaugurating the Seminar, Shri I. K. Gujral, Union Minister for Works, Housing and Urban Development, emphasised the need for streamlining the systems and procedures prevalent in the Central Public Works Department and set the pace to the discussions by spelling out the utility of performance budgeting in the efficient management of projects and works. The Seminar benefited considerably from the intimate participation of Shri O. Muthachen, at that time, Chief Engineer, Delhi Administration, who later took over as Engineer-in-Chief, Central Public Works Department and continued to take interest in the new techniques of management. The Seminar also received the cooperation of other senior engineers and officers of the Department as well as the Ministry and Audit. Certain new ideas were thrown up and some missing gaps in the study pointed out. These have been taken into account in bringing out this Volume.

It is hoped that the study would prove useful not only to the CPWD but also to other organisations both at the Centre and in the States. The Institute proposes to undertake similar studies in two or three states and to bring out a practical manual on performance budgeting for the guidance of those connected with its introduction in India.

G. MUKHARJI

Director

New Delhi
August 1971

INDIAN INSTITUTE OF PUBLIC ADMINISTRATION

Preface

The Government of India have accepted the recommendation of the Administrative Reforms Commission regarding performance budgeting contained in their Report on "Finance, Accounts and Audit". As a first step, performance budgets of certain Ministries/Departments and Organisations at the Centre are being presented to the Parliament since 1968-69. Efforts in this direction are intended to cover all the developmental departments in due course. Certain State Governments have also been preparing performance budgets in respect of some of their departments.

The introduction of performance budgeting in any organisation involves a good deal more than a mere conversion of the format as a post-budget exercise. Pending the necessary accounting support, the various administrative, financial and work procedures of each organisation have to be suitably streamlined and the financial management system strengthened. It was with a view to demonstrate the areas that need to be improved before performance budgeting could be installed, that the Financial Management Unit of the Indian Institute of Public Administration took up the study of the CPWD, an organisation which, in terms of both the nature and magnitude of operations and the natural units of work measurement it offers, was considered suited for a pioneering study of this nature. The pursuit of this study was possible because of the encouraging response and support we had from Shri P. R. Nayak, the then Secretary, Department of Works, Shri Kartar Singh, Joint Secretary in the Department and Shri C. P. Malik, Engineer-in-Chief, CPWD. The Study was restricted to three construction divisions which are broadly representative of the activities of the CPWD. The results of the Study were discussed in the Seminar held at New Delhi in the Institute on the 6th and 7th of May, 1971. This volume incorporates the suggestions thrown up at the Seminar.

During the course of the Study, we had very useful discussions with the Superintending Engineers of the concerned circles as also with the Executive Engineers of the three divisions studied. We are very grateful to them for their kind cooperation, guidance and help. We are also thankful to the officials of these divisions for their excellent cooperation. We are grateful to our Director for the encouragement he gave us and for writing the foreword. Finally, we are thankful to all our colleagues in the Institute, particularly Prof. M. J. K. Thavaraj, for the guidance and advice they rendered us.

New Delhi
March, 1972

AUTHORS

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PART I

Introduction

The Central Public Works Department was selected as one of the areas where the applicability and use of performance budgeting in the management of programmes and works could be demonstrated after making a study and analysis in depth of the objectives and structure of the organisation, planning and execution procedures, administrative and financial powers and responsibilities at the various levels, prevailing norms and standards and the existing accounting and reporting systems. Such a study would enable the evolving of suitably adjusted organisational structure, improved financial and project management procedures, development of appropriate norms and yardsticks and consideration of other necessary issues for the introduction of performance budgeting. This study was proposed to be initiated with the division in the CPWD which is the executive and accounting unit. For this purpose, four* representative construction divisions were selected in consultation with the Department of Works, Housing and Urban Development and the Engineer-in-Chief. A note indicating the approach to the study is enclosed as Annexure I to this Part. The concept of performance budgeting is briefly outlined in Annexure II.

Part I of this study is devoted to an identification of the issues involved, their analysis and suggestions for necessary improvements or changes. The case studies of the three divisions containing the draft illustrative performance budgets and the tentative system for progress reporting form Part II. In respect of one major work in one division, network (PERT/CPM) showing schedule of construction has been drawn as part of the study in consultation with the division. This network is shown in Part III with a brief outline on the network technique and its use in budgeting, reporting and control. The summary of recommendations is given in Part IV.

The study was initiated by the Financial Management Unit of the IIPA in December 1969 starting with Construction Division No. IV, New Delhi. The other two divisions, namely, Food Storage Division, New Delhi and Civil Aviation Division No. II, New Delhi, were taken up one by one thereafter. The relevant records in the Divisions were looked into and issues discussed with the Executive Engineers and the divisional staff in a series of meetings. The performance budgets and the network were prepared by the divisions with the help and guidance of the Unit.

Organisation of the CPWD

The Engineer-in-Chief is the head of the organisation. His office in Delhi is a controlling office and does not itself take up any execution of works which is done by the Chief Engineers

*Study since restricted to three divisions only.

of the different zones. The Department functions on a zonal basis and all works of the various Ministries/Departments in a particular zone or area are handled by the zonal chief engineers, with the exception of the Food and Electrical Zones. The zone of each Chief Engineer is divided for administrative and technical purposes into circles, each under a Superintending Engineer. Each circle is further divided into divisions, each under the charge of an Executive Engineer. The basic executive unit of the Department is the division, which is again divided into four or five sub-divisions, each under the charge of an Asstt. Engineer/Asstt. Executive Engineer. Each sub-division has under it, four to five sections, each under the charge of a junior engineer who is the basic supervisory official in charge of works.

A Superintending Surveyor of Works is attached to each zone to assist the Chief Engineer in planning, designing, estimating, preparation of tender documents and other allied technical matters. The Superintending Engineers in the circles are assisted by Surveyors of Works. Assistant Surveyors of works have also been provided in certain divisions. In addition, there is the Architectural wing with a Chief Architect assisted by Senior Architects and Architects. A Senior Architect with necessary assistance is also attached to each zone. There is also a Central Designs Organization under a Chief Engineer (Designs) for the promotion and use of modern technological developments in India and abroad in the field of planning, designing, etc. for effecting economy in construction costs. In addition, there is a Horticultural Directorate and a Vigilance Unit under a Director and Chief Engineer respectively.

Jurisdiction and Scope of Work

The CPWD is the agency of the Central Government operating throughout the country for the design, construction, maintenance and repair of all works and buildings financed from the civil works budget. Works of the Railways, the Department of Communications and the Department of Atomic Energy are not undertaken by the CPWD. Similarly, except in special cases, Defence works are also not executed by the CPWD. The jurisdiction of the Department includes technical control over the P.W. Departments of Union Territories, maintenance of National Highways in Delhi and Highways in Sikkim, certain roads in NEFA and in Sikkim (other than Border Roads) and road works financed from the Central Road Fund in Delhi (excluding roads in urban areas of Delhi and New Delhi). Besides, CPWD is presently constructing roads in Nepal and Bhutan also. Deposit works on behalf of private bodies, corporations, etc. are also undertaken by the CPWD.

The CPWD constructs a variety of buildings and works to meet the requirements of the Central Government offices, residences, schools, colleges, hospitals, radio stations, airports, roads and bridges. The workload of the Department has grown steadily over the past few years and it is now of the order of about Rs. 70 crores per annum.

Working of CPWD—Planning and Execution of Works

The first stage for any Ministry desiring to have construction work is the selection of site. This is usually done in consultation with the CPWD regarding its suitability from the engineering point of view. Having arranged for the acquisition and possession of land, the Ministry intimates its requirements to the CPWD/Chief Engineer concerned. The C.E. arranges for a detailed field survey of the site and the preparation of a site plan. This is supplied to the Senior Architect who prepares the lay out plans and architectural drawings for the work. The site plan usually takes about 6 to 8 weeks and the preliminary architectural drawings about 3 to 6 months depending on the size of the work. The architects keep in close touch with the client Ministry for their approval and for such clarifications, modifications, etc. as may be found necessary. Delays occur at this stage, if the Ministry makes large scale modifications to their original requirements. After these are settled, a preliminary estimate of cost is prepared and sent to the Ministry for necessary expenditure sanction, which now covers administrative approval as well. This normally takes about 6 to 8 weeks or even more. In the case

of works costing more than the prescribed limit, approval of the Expenditure Finance Committee is also required before the expenditure sanction can be issued. After expenditure sanction is given, detailed architectural drawings are prepared by the architect in consultation with the surveyor of works organisation, electrical and other authorities. This usually takes about 2 to 6 months. After this is done, the surveyor of works organisation prepares structural drawings and detailed estimates of cost. This process takes about 2 to 6 months.

The next stage is the according of the technical sanction to the detailed estimate by the appropriate authority in the CPWD. Approval is also given to the Notice Inviting Tenders and tenders are called for. Complete architectural and structural drawings are now required to be made available to the tenderers along with tender forms. When the competent authority takes a decision on the tenders received, the Executive Engineer writes a letter to the contractor accepting his tender and asking him to commence the work. Most of the works in CPWD are executed through contractors. Thus a period of about one to two years is usually taken from the conception of a work by the Ministry concerned up to the time the work is awarded to the contractor. This is exclusive of any inordinate time taken by local bodies for approving layout and building plans or by the client ministries in issuing administrative approval and expenditure sanction.

The various issues in the planning, programming and execution of works in the CPWD, the administrative and financial procedures involved and the causes for delay and inefficiency were gone into in detail by the Buildings Projects Team of the Planning Commission and the Govinda Reddy Study Team some time back* and a number of recommendations were made for streamlining the system and procedures with a view to ensuring efficiency and speed. Some of their recommendations have already been accepted and acted upon by the Government. However, significant issues bearing on financial and work procedures and other structural aspects still remain to be tackled. To the extent they are deemed relevant to greater efficiency and economy in the context of performance budgeting, an attempt has been made in this Part to examine them and offer some suggestions for consideration.

*See Report on Public Works Administration (Committee on Plan Projects, Building Projects Team, New Delhi), 1962, and Report of the Study Team on the CPWD (Government of India, Ministry of Works, Housing and Urban Development, New Delhi), 1965.

Financial and Administrative Powers and Responsibilities

From time to time, various suggestions have been made by Committees, Teams and Study Groups for enhancing the financial and administrative powers of the officers of the CPWD with a view to increasing speed and efficiency in the execution of works. For example, the Govinda Reddy Team and the earlier Buildings Projects Team of the Planning Commission had recommended enhanced powers for Chief Engineers and other officers. Similarly, the Committee of Officers on the Reorganisation of the Structure and Works Procedures of the Ministry of Works and Housing, in Part I of their Report on Works Division, had suggested certain delegations from the Ministry of Finance to the Ministry of Works, Housing and Urban Development and from the Ministry to the CPWD. Most of these recommendations have been considered by the Government while issuing the revised schedule of financial powers in respect of works delegated to various officers of the CPWD. This consolidated schedule is added as Annexure III to this Part. The Administrative Reforms Commission also realised the "importance of the matter and the degree of uncertainty and fluidity that still exists on the subject", and had, therefore, touched upon certain aspects of delegations in their Report on Delegation of Financial and Administrative Powers. Their observations have been reflected in the said Annexure III.

The schedule of powers appended in Annexure III is only in respect of certain items on the works side and does not include the various other administrative and financial provisions appearing in the CPWD Code, Manual or elsewhere. Apart from the fact that the delegations in respect of works have not been of such a dimension as to achieve a radical improvement in the operational efficiency, there are other issues having a bearing on the execution of works, over which administrative and financial powers are still with the Department of Works, Housing and Urban Development. Instances were quoted during discussions, where even suggestions of a technical nature, duly processed and recommended by the Engineer-in-Chief, were either not cleared or held up for a long period at the Secretariat. On technical matters it is obvious that the contribution by the Secretariat would be very little. In addition to long time consuming and sometimes futile discussions with a hierarchy of non-technical officers on endless notings, this affects the speed and efficiency of works as also the morale of senior technical people. It is, therefore, necessary that maximum possible administrative and financial powers having a bearing on the performance of a technical organisation like the CPWD are given to the Engineer-in-Chief. The relative roles of the CPWD and the Secretariat in this context and the organisational improvements in this regard are dealt with later in Chapter 3 of this Part. In any case, the scheme of delegation of administrative and financial powers should be such that the Engineer-in-Chief of the CPWD is given full

powers on all matters relating to and having a bearing on the implementation of the policy and execution of works, for which he is fully accountable. The Engineer-in-Chief should be in a position to decide finally on matters relating to the technical aspects of works, such as procurement of stores, machinery and T & P, purchase of stationery and materials, contracts as well as sanction of staff and organisation necessary for the execution of works, either by himself or in consultation with the Works Division of the Ministry of Finance directly without routing the proposals through the administrative ministry. How he will share his powers and responsibilities with the officers in his department is a matter to be best left to the Engineer-in-Chief. He should periodically review the entire scheme of delegations. (See pages 7, 8 and 9).

In respect of delegations regarding works appearing in Annexure III, the financial limits appear to be still on the low side having regard to the increased cost of labour, material and machines and the huge magnitude of works now being undertaken by the CPWD. The ceilings laid down are such that quite often the Executive Engineers and even the Superintending Engineers have to go up for approvals and sanctions. The top management, in the present set-up, is engaged on deciding matters which could more appropriately and with the required competence be attended to at lower levels with greater efficiency and speed.

The members of the Unit had discussions with some of the engineers of the Department on the effect of the enhanced delegations on speedier execution of works. It was their general view that the Executive Engineer, who is held responsible for results, is not clothed with sufficient authority and powers to enable him to work without inhibitions. The Executive Engineers feel that responsibility without commensurate power and authority has been dampening their initiative and hampering the smooth progress of work. The skill and competence of a responsible and technically qualified officer of the status of an Executive Engineer, they point out, should be utilised to the full. This will be possible only if he is trusted and increased financial and administrative powers are delegated to him. There is some force and substance in what they say. To give one striking illustration of the trust which the Government places on the competence of an Executive Engineer, it may be pointed out that, at present, an Executive Engineer (of a strengthened division) is authorised to accord technical sanction to a detailed estimate which implicitly means structural soundness of designs also, up to Rs. 1 lakh only. This amount hardly covers the cost of an ordinary single storeyed structure. Yet, an Executive Engineer in charge of a construction division dealing with residential accommodation is entrusted with the responsibility for the execution of structurally complex multi-storeyed buildings! It is, therefore, necessary to re-examine the entire system of delegations in the CPWD to make them more purposeful and imaginative.

Without going into individual items of delegations which calls for a detailed study by experts in the field, certain aspects of the existing powers having a bearing on performance are considered here in the following paragraphs. These are highlighted, as problems arising therefrom were referred to during discussions the members of the Unit had with the engineers of the department.

It is understood that the present practice in the CPWD is to divide a major work into specific sub-heads. For purposes of according technical sanction to detailed estimates of these sub-heads and award of works, the monetary value of the sub-head is taken as the criterion to determine the competent authority. In this process, the overall picture of the work and the relationship of the part to the whole are likely to be lost sight of resulting in lopsided progress and anomalies in both planning and execution. If for instance, there is a building project which costs Rs. 15 lakhs, it falls within the powers of the Chief Engineer. The project consists of, say, three distinct parts—a multi-storeyed office building in which provision for centralised over-head water reservoir exists, residential flats and a single storeyed block for library. Under the present practice, if the multi-storeyed portion costs Rs. 11 lakhs, this will be handled by the Chief Engineer. The other two portions costing, say, less than Rs. 10 lakhs and 1 lakh respectively, would be entrusted to the S.E. and the E.E. In the

absence of a single agency planning and scheduling the work, the residential flats may come up first without having the necessary water supply arrangements, which may be planned to be on the top of multi-storeyed office buildings. In other words, there may be chances of the work being not executed in a coordinated and integrated manner. Therefore, it is necessary that the planning, designing and estimation of the work as a whole should be done by a single agency and not split up into sub-heads for purposes of planning, designing, estimating and execution by different authorities with reference to their financial powers. This will also be in consonance with the very idea of entrusting bigger works involving more outlay to higher officers who are supposed to possess a higher degree of expertise and who are better equipped in handling the planning of costlier works. This objective will be lost, if the work is split up and given to lower officials.

At present, the CPWD has no powers to sanction expenditure on initial surveys, watch and ward and such other preliminary expenses. It is vested with the administrative ministry concerned. This often leads to delays in proceeding with the work. It is understood that in practice, the divisions sometimes incur expenditure on these items and debit it to some work or head of account pending receipt of the approval by the ministry concerned. It would be desirable that the Chief Engineers are given the power to incur such expenditure, initially chargeable to 50—Public Works, and later to be transferred to the work concerned on receipt of expenditure sanction for the work.

The Executive Engineer has now powers to accord technical sanction to detailed estimates up to Rs. 40,000 only (Rs. 1 lakh in divisions having an A.S.W.). This appears to be totally inadequate in the present day. The powers could be raised to Rs. 2 lakhs or any higher figure considered appropriate. Elsewhere in the Study, it has been suggested that all divisions should be provided with an A.S.W. and/or A.E. (Planning), to strengthen the divisions to handle works of planning, estimating and contracting etc. The power to accept lowest tender by the E.E. could also be raised corresponding to the increased power to accord technical sanctions.

The existing powers of the CPWD officers regarding accord of sanction to extra/substituted items need to be modified in the interest of speedy execution of works. Subject to the provision that the cost of the work as a whole does not exceed 10 per cent of the amount administratively approved, the Superintending and Executive Engineers must have the full powers to accord sanctions to extra/substituted items in respect of contracts falling within their jurisdiction. As regards contracts beyond their powers, suitable ceilings could be laid down for scheduled and non-scheduled items separately beyond which the approval of the S.E./C.E. may be insisted upon. Even in such cases, for scheduled and agreement items, only the permission of the authority approving the N.I.T. is needed to carry out the item. Once this is done, the rate could be determined by the Executive Engineer on the basis of schedule of rates or the agreement rate as the case may be. In respect of other items, the authority which approves the carrying out of the extra item, should also sanction the rate.

Similarly, the existing powers regarding award of additional quantities against abnormally high or low rated items (variations being more than 25 per cent as compared to the estimated rates) need to be rationalised. The schedule of delegation of powers lays down certain ceilings for award of additional quantities against abnormally high/low rated items. With the present limit of 25 per cent variation over estimated rate, most of the items of work in item rate agreements become 'abnormally' high rated items, though the rates for these may not compare unfavourably with the prevailing market rates. This is primarily because the estimated rates are based on out-dated schedule of rates. To make the estimated rates realistic, market rates with reference to official cost index should be taken into account and the former re-worked out. Alternatively, as recommended by the Technical Board of the CPWD, the estimated rates should be increased by the overall percentage of the agreement (contractors' enhancement), further enhanced by 15 per cent and then compared with the rate of the item in

question. This course is suggested for deciding the abnormality of rates, as it will not be possible to up-date the schedule of rates frequently. If this is done, cases where rates are considered abnormally high will be rare and the use of delegated powers will be limited only to items which are abnormally, high or low with reference to the up-dated estimated rates.

The works done by the CPWD are subjected to checking by the Chief Technical Examiner's organisation. At present the disputes arising out of differences of opinion between the Chief Technical Examiner and the Chief Engineer of the concerned work are referred to the Ministry for a decision. The procedure does not appear to be rational, as it is quite apparent that there is hardly anything that the Ministry can contribute in such cases. A decision could more appropriately be made by an objective authority who has the experience and technical competence to match that of either, the C.T.E. or the C.E. The Engineer-in-Chief of the CPWD, who is also the technical adviser to the Government, can be expected to possess these and also judge matters with objectivity. A reference to the Ministry seems redundant.

Another matter that came up during discussions with the officers of the CPWD is the delays at the local bodies. Works are often delayed on account of the present practice of getting the lay-outs and individual building plans approved by the local municipal authorities. The occupation slips are also to be obtained from these bodies before the completed houses could be allotted. Instances were quoted where plans prepared by qualified architects of the department and submitted to the local body were examined there by officers of lower experience and status and returned with minor objections. An analysis of the queries raised by these bodies reveals that hardly any useful contribution is made by this exercise. After all, the government architects are equally responsible and, perhaps, more experienced than those in the local bodies. Besides, the plans are prepared keeping in view the master plans and municipal bye-laws. It is felt that the whole question of the need for approval of government plans by the local bodies needs to be re-examined, particularly when this results in avoidable paper work and waste in efforts, time and thereby cost. No doubt, the local bodies cannot be kept in the dark about the proposed government constructions, particularly when they are the custodians of the master plans for development. Nevertheless, there appears to be no need for getting the layouts and individual building plans approved by them. This seems to be wholly unnecessary. It would be enough if the overall plans and layouts are sent to the local bodies for their information. They could also be supplied with details of the requirements of services, viz, water supply, sewage, etc. The question may be examined by Government in all its aspects in consultation with the local bodies.

Another reason for the slow progress of works is the delay in procurement of stores, materials and equipment, either due to procedural difficulties in obtaining proprietary article certificates and sanctions for the purchase of materials from the Ministry or because of lapses on the part of the concerned firms (with whom D.G.S. & D. has rate/running contracts) to comply with orders. The recommendations of the A.R.C. in its Report on Delegation of Financial and Administrative Powers in this connection, are a welcome step towards cutting down such delays. The A.R.C. has recommended that the Chief Engineers should have full powers to issue proprietary article certificates where considered necessary, for purchase of certain brands of materials found by them to be appropriate for certain specific or specialised purposes. It has further recommended that in extreme urgency, the Chief Engineers should have full powers to make direct purchase of materials and stores from whatever source considered advisable, provided the rates are either at par with or less than those prescribed by the D.G.S. & D. for the same articles or articles of similar specifications under a rate/running contract. However, these recommendations may not go a long way in obviating delays, unless the Engineer-in-Chief has full powers on all matters relating to the procurement and purchase of stores, materials, machines and equipment. He should have full powers for making alternative arrangements even by way of direct purchases in cases where the firms specified by D.G.S. & D. fail to fulfil their obligations in time. Wherever concurrence of the Works Division of the Ministry of Finance is needed in such matters, he could take it up direct with them without the involvement of the administrative ministry. (See also pages 8 and 9).

Structural and Organisational Aspects

Apart from a meaningful scheme of delegation of required administrative and financial powers, the success of performance budgeting depends on a well organised structure defining specific responsibilities at various levels in the management. Without a clear-cut and rational structure which will facilitate identification of responsibility centres and create a built-in feed back channel, performance budgeting will not be an effective management tool. A technique like Performance Budgeting, if sought to be imposed on a system, without preparing the necessary ground work for the needed organisational support and identifiable responsibility areas, will only result in a mere change in the format of the budget without having the desired impact on the effectiveness of planning, execution and control mechanism.

The Buildings Projects Team (Committee on Plan Projects) in their Report on Public Works Administration (1962) had gone into the organisational and administrative aspects of Public Works Administration and recommended a number of measures to make the Public Works Organisation a fit instrument for carrying out the tremendous developmental activity of a complex technological nature that is being entrusted to them on an increasing scale. In para 7.5 of the Report, they had stressed the need for urgent action to re-define the relative responsibilities of various levels of officials in the Government and to delegate authority to those on whom the responsibility for results rests. In keeping with this overall perspective, they had, in para 7.9 of their Report, recommended that the post of the Secretary to the Engineering Department should be held by the highest technical authority, *i.e.*, the Chief Engineer of the State. In the Central Government, as the Ministry deals with subjects other than works also, on the analogy of the above recommendation, they had suggested that the senior Chief Engineer (*i.e.*, the Engineer-in-Chief now) should appropriately be an Additional Secretary to the Government in that Ministry. In other words, the offices of the Engineer-in-Chief and the Additional Secretary should be combined into one as an integral part of the organisation.

The proposal to make the Chief Engineer, a Secretary to Government also, has been the subject of controversy for many years now. It is not within the scope of this Study to go into the details of this. Nevertheless, it would appear that the traditional concept of the Secretariat exercising powers over the technical organisations like the CPWD on matters connected with execution of works, needs change. During the discussions the members of the Unit had with the CPWD officers, it was found that there is a general feeling that the present set-up of the Secretariat is one of the major obstacles in the speedy and efficient execution of works. At present, it was pointed out, the Ministry retains some administrative and financial powers even in respect of matters involving technical understanding and appreciation. For instance, for sanctions in respect of purchase of machinery, stores and T & P of certain kinds and above certain limits, settlement of certain types of contractors' claims, entering into

negotiations with contractors, making alterations in contract conditions due to unavoidable reasons, approval and acceptance of new techniques or methods, appointments of appropriate senior technical personnel, sanction of staff required for the works, opening of new divisions/circles as and when justified, etc., the cases are required to be referred to the Secretariat, even though the highest technical adviser to the Government has found the necessity and justification for the same. What is worse, his proposals suffer "a sharp vertical drop to the bottom rung of the Secretariat department until, it starts moving from this point to middle and the highest levels of the Secretariat in course of normal processing". Needless to say, this process is not only time consuming and purposeless, but also a source of "great annoyance and frustration to both the planning and the executing organisations".

Though it is a salutary principle to make a distinction between policy making (secretariat) and executive functions, the difficulty, as in the case of the CPWD, arises in defining what is policy formulation as distinct from functions incidental to execution. So long as the Secretariat confines itself to general policy matters only, there would have been no cause for complaint. But what is happening now is that the Secretariat, which ought to be mainly concerned with policy formulation and overall direction, also seeks to exercise executive control and retains the ultimate authority on deciding matters which are best left to the head of the executive organisation.

The Administrative Reforms Commission in its Report on Delegation of Financial and Administrative Powers, had emphasised that decisions of an operative type should be decentralised to the 'lowest appropriate levels'. The lowest appropriate level has been defined as the "point at which conditions of technical skill and experience (the 'law of the situation') are ruling. Within the framework of organisation policy, speed and rational operation demand that decision making be delegated to those whose special competence is related to the particular decision situation." It flows from this recommendation that the Engineer-in-Chief should be the highest level responsible for the implementation of the policy or the execution of works and he must have full powers on all matters which have a bearing on the performance and execution. There is no need for the Ministry to retain any powers in this regard. It should concern only with the formulation of policy. If this is accepted, the Engineer-in-Chief will have full powers on matters such as purchases, entering into contracts for procurement of machinery, equipment, materials and stores, sanction of staff required for the execution of works, etc.

Any attempt at improving the performance of the department should start with some bold and radical changes in the administrative set-up, particularly at the top level. No improvement over the existing conditions can be brought about by *ad hoc* and piece-meal changes at the middle or lower levels of management or by minor adjustments at the top. The discussions with senior engineers of the department highlighted general frustration among them owing to the role and attitude of top management comprising the Secretariat as it functions now. They feel the need for an atmosphere in which they could deliver the goods under the direction and guidance of the senior most technical officer clothed with the required powers. It is, therefore, our considered view that unless the Engineer-in-Chief is made an Additional Secretary to Government in the Works Division of the Ministry and his organisation suitably integrated with the Works Division (more or less on the pattern of the Roads Wing of the Ministry of Shipping and Transport), there cannot be any radical improvement in the performance of the department. This aspect needs consideration by Government.

Another aspect which has a bearing on the performance of the department is the need for the association of the CPWD in the formulation of plans right from the stage the proposals are sent to the Planning Commission. Presently, the plans are formulated without the association or knowledge of the CPWD, and as such, the data assumed for planning often do not correspond to the realities. In some cases, contracts for some complicated equipment involving huge amounts are entered into by the administrative ministries without bringing

the CPWD in the picture. In the absence of functional details and proper designs, things go awry and many deviations become necessary later when the implementation is entrusted to the CPWD. This lacunae could be obviated, if the CPWD is kept in touch with the developments at each stage. The organisational change mentioned earlier is particularly relevant in this context.

There is yet another important aspect regarding the performance of the CPWD and that is the delay in the sanction of projects and issue of Administrative Approval and Expenditure Sanction by the administrative Ministry. The Ministries seem to be taking long time in issuing sanctions to projects. Instances were quoted where the preliminary estimates for proposed works were required to be sent immediately by the CPWD, but on their receipt, there were unconscionable delays at the Ministry in issuing the sanctions. Again, after sitting pretty over the issue of sanctions, the Ministries desire works to be taken up urgently without allowing the minimum time for planning and designing. A study of the nature of objections raised on scrutiny and the time taken for this by the administrative Ministries reveals that the sanctions are delayed because of lack of adequate understanding and appreciation of technical proposals on the part of persons responsible for issue of sanctions. The estimates are often returned for marginal reduction in plinth area rates or for deleting certain provisions in the estimate. The result is that sanctions get delayed causing waste of labour, time and cost. A comparison of the cost initially indicated in the estimate with the actual expenditure after revising the estimates on the basis of scrutiny by the Ministries has revealed that in a number of cases, the actual expenditure was much higher than the cost initially submitted. This is because sanctions were issued long time after the estimates were initially submitted, and in the meantime, the cost of materials and labour went up. The overall increase in the cost of the project due to delay in the issue of sanction more than offsets the small saving that might have been effected due to cuts imposed by the Ministry.

The duties of the various officers of the CPWD are laid down in the CPWD Code and the Manual. A reading of these provisions would show that the duties and responsibilities outlined therein are only in broad and general terms without being specific. Since these are in general terms, in actual practice, there is often a blurring of responsibilities and a certain amount of confusion. The position of the Executive Engineer, for example, is a case in point. He has been made responsible for the efficient execution and management of all works within his jurisdiction. He is, therefore, expected to organise and supervise the execution of works in such a manner that they are efficiently and economically carried out. As primary disbursing officer of the division, he is responsible for ensuring financial discipline and propriety. In addition, he is responsible for the proper maintenance of accounts and control over expenditure. There are various other responsibilities placed on him covering wide range of subjects from routine office administration to arbitration and court cases arising out of works. The Executive Engineer is assisted by his Divisional Accountant on matters relating to accounts and finance and by the sub-divisional officers and junior engineers in the matter of execution of works. Though certain responsibilities have been laid down for these officials also, in the ultimate analysis, the overall responsibility for the omissions and commissions of one and all is placed on the Executive Engineer. It is obvious that such wide ranging and sweeping responsibilities make him practically helpless to shoulder them. What is needed is a clear enunciation of the specific responsibilities of each of the officials. The areas of responsibility that rightly fall on the Executive Engineer as distinct from his subordinates should be re-defined in specific terms. The Executive Engineer is too much concerned with the regularity of the transactions in the division that he often plays safe to the neglect of dynamic execution of works with speed. At each level of management, responsibility and authority should be clear and the atmosphere should be such that freedom of action becomes a reality.

The division being the basic executive unit, the performance of the Department depends largely on the performance of the division, which in turn depends on the Executive

Engineer. In the present set-up, the Executive Engineer is so much burdened with routine office work that he can hardly devote time on the technical control and supervision of works which is his primary function and for which a person of his qualification is required. The fact, however, is that a large part of his time is devoted to items other than supervision and control of works. The Report of the Govinda Reddy Study Team on CPWD gives, in Appendix IV, an analytical study of the utilisation of time by the Executive Engineer. It can be seen there from that an Executive Engineer has normally to put in about four hours of overtime per day to do his normal office and other work without taking into account the time to be spent on study of architectural and structural drawings, specifications and technical literature which should in fact be an important part of his work to which maximum attention should be devoted. Bulk of the time is accounted for by accounts, budget and other administrative work. In spite of this state of affairs having been pointed out by the Team, it is not known why no concrete steps have been taken to reorganise the work in the Divisional office to enable the Executive Engineer devote more time on important technical matters without getting lost in routine accounts returns and other office work. Certain suggestions have been made later in this Study for relieving the Executive Engineer of some of his work. (See pages 12, 13 and 18).

The importance of planning in the execution of works has been emphasised and recognised by the various expert bodies in the past. This is more so in the case of the CPWD where works are mainly carried out through the agency of the contractors. The basic function of the department in such cases is the proper planning, estimation, formulation of contract and implementation of the contract through supervision. At the execution stage, the department is not so much worried about procurement of labour and bulk of the material as these are the functions of the contractor. It is more concerned with the proper implementation of the contracts and the control over progress. The main job of the department is primarily up to the pre-contract stage. The organisational structure of the department should be so streamlined that this aspect is duly taken note of.

It is well recognised that considerable economy and reduction in cost can be effected at the planning stage. In the context of the huge size and complexity of the developmental activities, planning and designing have assumed great importance and is a job of specialists. A Central Designs Organisation for the promotion and use of technological development in the field of planning and designing, has already been created for effecting economy in construction cost. The need for the bifurcation of quantity surveying and structural planning had been recommended by the Govinda Reddy Team in para 4.3.5 of their Report. As suggested in the Govinda Reddy Team Report, bifurcation at the zonal level was to be achieved by allotting the two functions of quantity surveying and structural planning to a Superintending Surveyor of Works (S.S.W.) and Superintending Engineer (Planning), respectively, each assisted by such number of Surveyors of Works and Executive Engineers (Planning) as may be warranted by workload. The S.S.W. will attend to all matters relating to quantity survey and estimating, contracts, arbitration, court cases, etc. The S.E. (Planning) will attend to all planning and designing work other than specialised items dealt by the Central Designs Organisation. Such a set-up exists in the M.E.S., a sister organisation.

Though the Govinda Reddy Team's recommendation regarding the bifurcation of the two functions of quantity surveying and structural planning was a step in the right direction, it does not appear to have been fully implemented. At the zonal level, for instance, the bifurcation has not yet been achieved fully. Though each zone has now an S.S.W., there is no corresponding S.E. (Planning). The S.S.W. has a number of Surveyors of Works (S.Ws.) under him. In some cases, the work of the S.Ws is distributed on a territorial basis (dealing with the entire work of assigned circles/divisions), while in others, bifurcation to some extent seems to have been done by allotting specific areas of work like planning, designing, estimating and contract cases to different S.Ws. It would appear desirable to have one S.S.W. and one S.E. (Planning) at each zone to take care of their respective functions. The

quantum of assistance to them may be determined on the basis of the workload. At any rate, the level of the officers in charge of the two functions should not be lowered. As mentioned elsewhere in the Study, all works falling within the competence of the Chief Engineer should be handled as a whole by the C.E. with the help of the above mentioned organisations and not split up to be passed down the hierarchy. Also, all the work involved, including matters incidental thereto, should be handled exclusively by them without involving the lower formations except for obtaining the necessary data.

So far as the circles are concerned, the question of having both a S.W. and E.E. (Planning) or only a S.W., is a matter that should be left to be decided by the Engineer-in-Chief, as not all circles could be brought under one uniform yardstick. For example, heavy construction circles may need an S.W. as well as an E.E. (Planning), but not those circles having maintenance works or a combination of maintenance and construction work. The assistance to these officers will, however, depend on the workload. As in the case with the Chief Engineer, the works falling within the S.E.'s competence should also be handled as a whole in his organisation, without splitting them up. The work of planning, etc., should be handled at the circle level without unnecessarily involving the lower formations, except for collection of data.

In the chapter on Administrative and Financial Powers and Responsibilities, it has been suggested that the powers of the E.E. in the matter of accord of technical sanction and award of contract may be raised to Rs. 2 lakhs or more, and an A.S.W. posted in all divisions to assist the E.E. In keeping with the need for strengthening planning, heavy divisions may have one A.S.W. and an A.E. (Planning) to take care of contract cases, estimating and planning. Where the workload is not justified, one A.S.W. alone may be adequate. By providing every E.E. with an A.S.W., the former will be greatly relieved of some of his work and he will be in a position to devote more time on supervision. It is for the Engineer-in-Chief to decide which divisions should have A.E. (Planning) also in addition to an A.S.W., based on workload considerations.

The Govinda Reddy Team in para 4.3.1. of their Report was of the view that the A.Es. and junior engineers under an Executive Engineer are only supervising and executing agencies in the field and quantity surveying or structural planning is not among their legitimate functions. In respect of contracts within the powers of an A.E., therefore, these functions could be discharged by the A.S.W. and/or A.E. (Planning) in the division.

One of the problems that was stressed by the Executive Engineers during the discussions with them was the enormous time and labour involved in arbitration work. At present, all arbitration cases arising out of the work in a division are required to be handled by the Executive Engineer concerned. A suggestion was made that since the authority which accepted the contract/deviations is in a better position to explain the department's case than the E.E. carrying out the work, it would be more appropriate, if in respect of arbitration arising out of such contracts, the respective authority accepting the contract prepares the case, of course, with the required assistance regarding data and documents from the division, and pleads the case on behalf of the department. This will give relief to the Executive Engineer. Though it is true that an Executive Engineer is finding it difficult to find time for arbitration work in addition to normal duties, the solution to this problem seems to lie in the creation of one or more posts of Executive Engineer (Arbitration) under the Superintending Engineers. The Executive Engineer (Arbitration) posted in a circle could exclusively deal with all the arbitration work in the circle. Since, however, all records are with the division, the Executive Engineer of the division has to furnish relevant material when called for by the E.E. (Arbitration). Here again, it should be for the Engineer-in-Chief to decide which circles should have such special posts keeping in view the workload on account of arbitration and other factors. Purely maintenance circles or circles with less of problems may continue to have the present practice of the E.E. of the division attending to arbitration cases as well.

Higher officers like the S.E. or the C.E. will not be in a position to prepare and present arbitration cases. The number of senior counsels with the department could also be suitably increased by having one attached to each zone.

As stated earlier, the CPWD carries out works mainly through the agency of contractors. The main function of an Executive Engineer should, therefore, be the supervision of works and the ensuring of the fulfilment of contractual obligations. The extent of supervision required will vary with the type of contracting agency employed. The supervision required on works carried out by semi-government contractors, voluntary organisations, and private contractors will obviously be more than in case of works done by government agencies like NBCC, etc. The time to be spent on supervision should be on a realistic basis having regard to the importance of the work and the nature of the contracting agency. The principle of ABC analysis, can, for example, be applied with equal effect in the matter of supervision of works also, and a careful analysis made of all works requiring supervision and attention at various levels. This would reduce the total cost of the work, as the Department need not incur unnecessary expenditure on supervision in addition to what is already included in the cost of a work towards supervision cost of contractors and their profit element.

In respect of works carried out departmentally, there is, however, the need for more supervision and coordination, as the main difficulty in such cases is the procurement of material and T & P and arrangements for labour. As the codes and procedures in vogue in the CPWD are meant basically for contract works, there is a need for studying the various aspects of departmental execution and for framing suitable procedure for this purpose.

A discussion on the organisational matters will not be complete without examining the relative roles of engineers and architects in the department. As both the architects and the engineers have a key role to play in the execution of works, it is necessary that their relative spheres of working are clearly understood. This is considered necessary in the context of efficient financial and project management.

The architects in the department seem to feel that in the present organisational set-up, they do not have the required say in the supervision and control of works. They also feel that their ideas and drawings do not get fully translated into actual execution, as the engineers carry out many deviations to their plans without their consent. Consequently, the architects have to share the blame for bad architecture. The remedy suggested by them is that the organisational set-up should be altered so as to make the architects 'leader' of the team at every stage.

As regards the feeling of the architects that the engineers make deviations, which is the root cause of their concepts not being properly implemented, the discussions revealed that quite often, due to insufficient time available because of pressures from the administrative ministries for taking up works in a hurry, the architects are not able to do a thorough job complete in all aspects before the contracts are awarded. The architects also feel that their organisation is not adequately staffed. Whatever be the reason, the fact is that often the architectural drawings are deficient and lacking in many details at the time of issue of N.I.T. Consequently, the works are awarded on estimates based on incomplete architectural drawings. If the architects could or are enabled to do their job in time and complete in all respects, there would not be many occasions when they have to seek changes after the contracts are awarded. But in practice, architects come up with changes to their original plans during actual execution. Such changes have their repercussions on contractual obligations and project cost, thereby posing problems to the executive staff. The deviations/additions sought by the architects subsequent to the award of contract result in problems of settlement of rates with the contractor for extra/substituted items, deviations in abnormally high or low rated items or adoption of scarce materials which were not taken into account by the contractor at the time of tendering. In order to avoid these contractual and financial

implications, the Chief Engineer may sometimes resist changes and adhere to the original contractual provisions to the extent possible, perhaps, resulting in a certain amount of frustration among architects.

The remedy for the problem does not seem to lie in changing the organisational set-up, but in ensuring that the initial proposals and plans of the architects are formulated in complete shape and that all the required drawings and details are supplied by them before estimates are made and works are awarded. Subsequent changes having a bearing on the contractual provisions must be prohibited as a rule, excepting in cases when such changes are unavoidable. It may also be necessary that the architectural plans for prestigious buildings and buildings costing above certain monetary limits are examined and approved by the Chief Architect. These measures will not only ensure faithful translation of architects' concepts but also expedite progress and minimise contractual problems. To reckon the extent of shortage of top, senior and junior level architects, the department may, in consultation with the Chief Architect, work out the required strength on the basis of proper work studies.

The total workload of the CPWD amounting to about Rs. 70 crores comprises three portions, *viz.*, maintenance works, construction of roads, bridges, godowns, airfields, etc., and the construction of buildings. Out of the one-third workload involved in the building construction, a portion relates to repetitive type of constructions involving mass production of stereotype units such as residential accommodation of various types. It is mainly in the construction of non-repetitive types of buildings where the architects have an important role, the remaining works falling largely under the purview of civil engineers who share the largest proportion of the work in the department. The head of the building team, therefore, could only be a senior technical manager who is also the representative of the major field of activities of the department, *i.e.*, civil engineer. It is only he, who could discharge properly the responsibilities of project management, financial control and overall coordination and could be held accountable.

The existing set-up of the CPWD is based on the concept of 'leadership'. The zonal Chief Engineer, who is a civil engineer, functions as the leader of the team and is assisted by S.E. (Civil), S.S.W., S.E. (Elect.) and Senior Architect. It is only at this level where the various disciplines are attached to the C.E. (Civil). This is rightly so, as the zonal head is responsible and answerable for the proper execution of all types of civil constructions comprising buildings, roads, bridges, etc., which are entrusted to the zone. The functional requirements of the zonal head, who deals with all legal, contractual, financial and technical matters, are of an executive type and predominantly civil engineering in nature. However, at no other level, the disciplines of architecture, electrical or horticulture are attached under a civil engineer. The various disciplines function independently and all are equally responsible to the Zonal Chief Engineer. Among other things, the Chief Engineer in the zone also accords technical sanctions to projects costing more than Rs. 10 lakhs. The technical sanction means certifying the structural soundness and financial propriety of the proposals. These are not confined only to construction of buildings, but cover also construction of roads, bridges, overhead tanks or water supply and sewer lines, etc. The architects may have neither the required technical knowledge nor the experience to technically examine such predominantly civil designs and estimates and accord technical sanction.

The engineers at various levels in the department act as managers and organisers. They are the persons responsible for control of budgets and finances and control and supervision of works. They are also responsible for the successful implementation of contracts including payments, settlement of deviations and arbitrations. Their functions include liaison with the clients, investigation of market trends, field investigations, procurement of store, machines and equipment along with maintenance of proper accounts. The basic education of the engineers coupled with the experience they acquire as managers at different levels in the department during the course of their career, make them suitable for the posts of organisational heads

which are basically senior technical management positions.

A suggestion made in this connection was to make architects leaders of the team at various stages. In other words, they would be controlling and coordinating the work at each level. The functions of field officers involve executive, financial and contractual responsibilities. The lower officers go to higher ups for technical guidance, sanctions and approvals and the higher officers, must, therefore, be of higher technical competence of the required type. An examination of the problems confronted at the site and the decisions required from the 'leader', right from the stage of excavation to the finalisation of payments and settlement of deviations and arbitrations reveals, that the decisions required even in the case of construction of buildings are basically of civil engineering nature requiring knowledge of soil mechanics, design of structures, concrete technology, etc. It is obvious that an architect cannot function as the leader at any stage. His job, is, however, of a highly specialised nature and his importance in ensuring quality of architecture is unquestionable. As mentioned earlier, it is necessary that his initial drawings are complete in every respect. If that is assured, his contribution to the efficient functioning of the department lies in insisting on strict compliance of his conceptions during execution. If changes are made during the progress of works, it may not be always possible to carry them out for reasons explained earlier.

Lastly, the department may consider how best the existing training facilities could be improved and extended to cover all categories of officers and staff—engineers, architects, junior engineers, accounts staff, etc. As in case of other established central services, there should be pre-entry institutional training facilities, both in a central staff college and on the job. Similarly, there should be in-service training facilities for middle and senior level officers. There should also be periodical refresher courses so that the officers and staff may keep abreast of developments in modern technology and management practices. The department may also work out programmes for developing career management and specialisation of skills. The efficiency of the department depends on keeping the morale of the officers and staff high.

Accounting and Funding

A system of departmental accounting is the unique feature in PWD unlike in the case of most other civil departments. Funds for payments arising in a division, except establishment charges (including contingencies), are obtained by cheques drawn on treasuries. As the primary disbursing officer, the Executive Engineer draws cheques for disbursement to contractors, and with the aid of his divisional accountant (who combines in him the roles of accountant, primary auditor and financial adviser), renders monthly compiled accounts to the A.G. concerned under the prescribed heads of accounts. The monthly account is supported by various schedules which are extracts of some of the initial records kept in the division. The kind of records and accounts to be kept in a division/sub-division, procedure for procurement, recording and issue of stores, modes of payments to contractors, maintenance of cash, store and works accounts and various other accounting matters connected with works and contracts are laid down in the Central Public Works Account Code.

The PWD system of accounting dates back to the early years of this century. By and large, the system has stood the test of time. But, over the past two decades, with the increasing size and magnitude of the construction programme in the wake of planned development, the need for simplifying the outmoded and involved accounting procedures was being increasingly felt. A working group was, therefore, set up at the instance of the Committee of Administration, Department of Cabinet Affairs, under the chairmanship of the then Additional Deputy Comptroller and Auditor General, to examine and suggest measures to simplify the Account Code and up-date it in the present set-up. The group submitted its report in 1963. The Code has now been revised in the light of the above Report. It is, however, felt by the department that the revised code has not fully responded to the present-day needs. The system and accounting procedures are still complicated and cumbersome. In order to simplify the system, reduce accounts returns, relieve the divisional accountant and the Executive Engineer of unnecessary paper work and to remove practical difficulties and delays, it is the general feeling in the department that the codal provisions require a thorough review again. This may be examined by the Government in consultation with the Comptroller and Auditor General.

In the context of performance budgeting, apart from changes in the accounting procedures, there is a need to have a fresh look into the heads of account operated by the PWD to bring them along programmes and activities on a functional basis. At present, outlay on works executed by PWD is exhibited according to the departments/organisations under heads, "50—Public Works" or "103—Capital Outlay on Public Works", etc. Within these major heads, minor heads like 'original works—Buildings' and 'original works—Communications' are sub-divided according to the departments served. The Revenue and Capital outlay on both residential and non-residential/institutional buildings, and roads is now recorded under

the above common major heads. On a functional basis expenditure on general pool residential accommodation should be segregated from outlay on non-residential and institutional buildings, as the former constitutes a service to a class of the community, while the latter serves either to improve office accommodation in general or to contribute to the achievement of the objectives of the functions of governments in different fields, such as, education, health, agricultural development, etc., through construction of schools, hospitals, godowns, and so on. Outlay on these should legitimately be transferred to the respective functional heads. Similarly, outlay on roads comes under another function, Transport and Communications and, therefore, should be recorded under a distinct head. The accounting structure should be rationalised to achieve this.

The Government of India have constituted a Team of Officers to go into the whole question of accounting and budgetary reforms in the light of the recommendations of the Administrative Reforms Commission that have a bearing on performance budgeting and connected accounting changes. This Team has made some tentative suggestions for the splitting up of the PWD major heads on the above lines. These are being discussed with Central and State Public Works Departments. Along with the major heads, the Team is also working out minor heads under the new major heads to correspond to the functions and programmes of the various departments and organisations, against which outlay on works has to be accounted for. This again is being done in consultation with the Central and State PWDs. Since this work is being done by a special expert Team,* it is not proposed to go into details in this Study.

At present, in respect of Government works entrusted to the CPWD, funds are partly provided in the grants controlled by the Department of Works, Housing and Urban Development and partly in the respective grants of the client ministries, such as Information and Broadcasting, Civil Aviation, Finance, Food and Agriculture, etc. Funds are placed at the disposal of the CPWD for execution. In keeping with the proposals for accounting all construction outlay on non-residential and institutional buildings under the respective functional major heads, the Team of Officers are considering appropriate devices for centralised provision for all such works in a single Demand to be operated and controlled by the P.W. Department. Under this Demand, the various functional major heads (except a few such as those under general Services) will appear and the provisions included against relevant minor heads relating to construction of non-residential buildings. The minor heads under this Demand will be operated by the PWD for budgeting and accounting. This will enable all expenditure on such construction works being accounted for under the functional major heads without creating problems of fund control. Final decisions in this regard as well as other connected accounting matters and re-defining the Grants are to be taken at appropriate level in due course after the Team submits its recommendations.

It is understood that procedural improvements have been made in recent years enabling timely decisions on new works by the Works Priority Board and their communication to the CPWD as well as the client Ministries. One of the major shortcomings in the past was the absence of timely communication with the client ministries about the approval of new works and their provision in the next year's budget. Various demands for new works are made on the CPWD by the Ministries and Departments, all of which may not be accommodated by the Department of Works, Housing and Urban Development within the overall ceilings and priorities. Under the new procedures, it appears, all requests of Ministries for new works are processed and coordinated by the Department of Works, Housing and Urban Development with the CPWD on one hand and the Client Ministries on the other, and after discussions in the Works Priority Board, proposed budget provisions are intimated to them well in time before the new financial year. But, the executing divisions in the CPWD do not still come to

*See Circular No. 19/ARC/70 dated 18-5-70 and No. 1-1/ARC/71 dated 30-1-71 of the Comptroller and Auditor General of India.

know of their new works programme until they are intimated long after the budget is presented and passed, though the divisions are, in practice, more concerned with the receipt of administrative approval and expenditure sanction than with budget provision and may go ahead with the works on the implied understanding that funds would be taken care of during the course of the year. When the details of workload for CPWD as a whole are determined and known to it, the zone-wise, circle-wise and division-wise allotment of works should also be done without any delay so that no work is ordinarily taken up without there being a budget provision initially. (See also page 36).

There are sometimes complaints from the client Ministries/Departments that they are kept in the dark regarding progress of works entrusted to the CPWD and that, for want of coordinated efforts, the programmes, of which buildings are a part, receive setbacks. Discussions with the engineers of the department revealed that this is not true as regular progress reports are being sent to the parties and periodical meetings also held with the clients to review the progress and consider necessary measures. To the extent necessary, loose ends in the procedures could be tied up and regular contacts with client ministries ensured.

Just as the Executive Engineer is responsible for the proper maintenance of accounts in the division, the Engineer-in-Chief, as head of the department, is ultimately responsible for the state of accounts in the Department. At present, the divisional accountants in the divisions form the backbone of the system of departmental accounting. In the CPWD, S.A.S. Accountants from the Audit Department are now increasingly posted to work as divisional accountants. One of the main defects in the set-up, according to the Department, is that these divisional accountants are under the dual control of the Accountant General concerned and the CPWD. This, according to them, is not a desirable arrangement. When the head of the organisation is responsible for the proper maintenance of accounts in his organisation, those in charge of keeping the accounts within the organisation should be exclusively under his functional and administrative control. In other words, the divisional accountants should be borne on the CPWD cadre. Otherwise, control over their work and conduct becomes ineffective. There seems to be some force in this argument. The practical implications of such a step may be considered by Government in consultation with the comptroller and Auditor General.

As stated earlier, the E.E. devotes bulk of his time on routine office work. Even so, he is unable to pay adequate attention to accounting matters and this has resulted in mounting arrears in accounts. One possible way to improve the situation is to give specific accounting and administrative functions to the ASWs to be posted in each division. They could look after accounts returns, budget and other administrative matters on behalf of the E.E., who could then find more time for supervision and control over works. The A.S.W. could also be the head of office in respect of all establishment matters. The overall authority and responsibility of the E.E. will not, however, be whittled down. Only, he is given competent assistance and relief. The A.S.W. will also get the required experience in this way. The posting of A. E. (Planning) to heavy divisions will enable the A.S.W. to find enough time for this additional work. Details as to how this could be done may be examined by the department in all its aspects.

One of the difficulties in the present set-up expressed by a number of engineer officers of the Department, is about reconciliation of divisional figures with those of the Accountant General. A suggestion was made that the divisional engineer should not be burdened with this time-consuming work, as it should be the responsibility of the A.G. to have his figures reconciled with the primary records in the Division. It is difficult to appreciate this point of view. As in the case of other departments, it is one of the duties of the controlling and disbursing officers under the Financial Rules to maintain accounts for expenditure control with reference to allotments and have their correctness reconciled with the A.G. Therefore, reconciliation work is an important job of the division and cannot be done away with. Practical difficulties in the way, such as delays and irritants, can be sorted out through mutual cooperation and understanding.

Information System and Reporting

A well designed and meaningful information and reporting system is essential for managerial control. This is particularly so under a system of performance budgeting which requires to be continually sustained through a feed-back machinery. In the absence of a regular flow of feed-back data, control over the implementation of works and projects becomes ineffective. A good deal of literature on the requirements and characteristics of a proper information and reporting system is now available in any standard book on modern management. Broadly speaking, the following fundamentals are to be kept in view in developing an information and reporting system:

- (1) Timeliness and accuracy should be ensured;
- (2) Information system should correspond to and meet the needs of the organisational set-up in each department;
- (3) Reporting should be such that decisions are possible on it and that there is a two directional flow of information. Lower levels of management can take decisions on certain issues only to the extent of their powers. Beyond this, decisions of higher officers are required. For this, reports should be such as to draw their pointed attention to those areas and to get a feed-back from them regarding their decisions, so that corrective actions could be taken in time to set right over-runs, slippages, etc. It is often seen that information flows from bottom to top, but decisions from the top are either not communicated or they are delayed;
- (4) A system of reporting needs an independent data base to process and supply the information in a meaningful manner;
- (5) Reporting to higher levels should be based on the concept of 'management by exception'. Under this approach, only criticalities are highlighted for action by higher management. Reports are made in respect of items which do not progress according to schedule. Where powers to accept certain variations have been delegated to various levels, only those items where the variations cross the tolerance limit should be reported to higher levels;
- (6) The reports should not only reveal past happenings, but also be predictive and forward looking in nature. The reports should highlight problems, present as well as anticipated, so that attention of those concerned is alerted and corrective action called for;

- (7) There should be uniformity and consistency and all terms should be well-defined and understood; and
- (7) The details of the system should be according to the complexity of a work, but should be as simple and effective as possible.

An information and reporting system is primarily designed to facilitate analysis of progress of work against approved schedules. Information and reporting becomes more meaningful and effective when it is based on a 'Network' which is up-dated from time to time. The need for a Network Analysis (PERT/CPM) for programming and scheduling of works is dealt with in Part III of this study. The characteristics of an information and reporting system using network technique are:

- (1) Relevant information regarding the status of the work or project is summarised in such a manner as to bring most critical 'activities' directly to the attention of management at each level. The management is not burdened with needless details;
- (2) The reports highlight deviations from original scheduled plan and indicate the effect of such deviations in critical activities on the project completion date. The reports also indicate areas which might create problems on a future date; and
- (3) It promotes management decisions which may involve re-planning, re-scheduling or a change in the work objective itself.

Under a system where PERT or Network analysis is an operation, the following reports are usually sent:

- (1) *Project Status Report*: Summary of those activities/milestones which are most critical on the work or project on the date of reporting with the reasons and remedial action needed. This is accompanied by a *Project Status Analysis*.
- (2) *Project Milestone Chart* : Displaying on the basis of Master Control Network, scheduled date of completion for major milestones and the progress, indicating also the expected date of completion, the effect of each of these on the completion of the project or on other milestones.
- (3) *Project Cost Report*: This is sent to show actual costs both by contract and by the major items of work against what has been sanctioned in the original project or work plan.
- (4) *Management Summary Report*: This is to supply information to management at appropriate levels bringing out the overall time and cost schedules for the project or work as a whole and each major element thereof. This summary report highlights areas where problems are expected or are arising and require immediate management decision. It brings out time-schedule, slippages, and cost overruns, if any.

Illustrative formats showing the contents of the above reports are attached in Annexure IV to this Part alongwith some Display charts.

Reporting requirements are different in different stages. The information cycle can be divided into four broad stages—Objectives and Policy Formulation, Detailed Plan Formulation, Implementation and Control. As these stages are different in nature, the specific requirements for reporting under each stage and from one stage to the other are also different. Therefore, no one format of reporting will serve the needs at every stage. The basic elements of reporting in the policy formulation stage are the external information or data and the internal

feed-back generated. This is different from the requirements during the control cycle when summarised information on the progress of works appropriate to each level is the need. Similarly, the information required from the control to the policy formulation stage regarding the progress vis-a-vis plan targets would obviously be different in nature. In the control cycle, when the works are in progress, data as generated at the execution level is to be fed to the control levels of management. Only such information as one needs in performing one's functions should be sent to him, as any superfluous information only creates confusion, causes delays and mars the alerting quality of the reports. The information cycle is illustrated in Annexure V to this Part.

A study of the system of reporting prevalent in the three divisions of the CPWD which were taken up for study, revealed that, at present, it is inadequate and is not of much use for control purposes. (A brief note on the prevailing reports in these divisions is given in Part II). Reports are called for by the superior officers as a matter of routine. Very often information called for from the lower formation of the organisation is delayed and does not reach the controlling officer in time. Too many details are asked for, for which the operating level is not properly equipped. It was also seen that the details of information required are not properly thought of, defined and spelt out. As stated earlier, one basic aspect of good reporting that is often forgotten is that the degree of details that a particular level of management would require depends basically on the responsibilities and powers vested at that level. As the level goes up, quantity of information should decrease, while the quality should improve. In the CPWD, the reporting formats as prescribed by the superior officers or the client departments remain more or less the same for all levels of management. The filling up of the details in the prescribed forms starts at the sub-division level. The divisional officer compiles the information as received from the sub-divisions and sends it on to the S.E./C.E. as well as the client department. A perusal of the various reports showed that the nature and details of information obtained through the reporting system seem to serve only the purpose of keeping a record of what has happened. They are historical in nature, having no predictive and forward looking characteristics. They do not 'alert' the attention of the superiors in time. As such they do not very much serve the purposes of control. It is not surprising, therefore, that no action is generally taken on them by the superior officers. Even where a higher officer wants to take corrective action on the basis of a report, his attempts prove futile, as reports are either delayed or are too lengthy and generally lacking in pertinent details.

It was also seen that the sub-divisional office (the operating level) is required to fill in repeatedly in all reports, information which is already available in higher offices. For example, details of administrative approval, expenditure sanction, technical sanction, contract amount, anticipated cost of the work, etc., are required to be filled in by the S.D.O. every time. These details are better known in the divisional office where the records of expenditure and works are kept. It is, of course, necessary that a sub-divisional officer should give a clear picture about the progress of works under his charge periodically to the Executive Engineer. But he need not be asked to give information on matters which are already available in the division. At the level of the division, a proper data base should be created and developed for collection and dissemination of data.

In the CPWD, reporting has two major purposes to serve. First, it should serve as an instrument for control. Secondly, it should provide information material required by the superiors and the client departments. The reports as are being sent from lower levels in the CPWD are basically intended to serve the latter purpose. The control aspect is not adequately served now. The problem of management in the CPWD is not merely one of the complexity of works, but also the sheer number of works handled. For example, each sub-division deals with approximately 5-6 contracts for works in progress on an average. The number of such contracts handled in a division/circle/zone may be around 30-35, 150-200, and 750-1000 respectively. It is quite evident that if a Chief Engineer wants to control all the thousand works himself, by calling for reports from lower levels, he cannot possibly do

it. Similarly, an S.E. cannot control in details all the 200 and odd works himself. At the moment, reports in respect of each work goes up with a mass of details. No control is ever possible on the basis of these reports when a large number of works require to be attended to.

Quite a few engineers in the CPWD appear to rely more on personal inspections and discussions than on reports. Control through routine inspections is not a substitute for a control prompted by pertinent data generated through an information system. No doubt, a dynamic and competent engineer can and does exercise control by frequently inspecting the works at site and issuing on the spot instructions. These inspections are important to have first hand knowledge of the progress and problem and to ensure quality. But, where a circle or division has far flung divisions/units, inspections cannot be frequent. Also, periodical reports are of greater importance as an in-built system of control. In controlling a large number of works, it is quite obvious that a selective approach will have to be followed and attention concentrated on such works as account for a major share or those which give rise to more problems. The concept of 'management by exception' based on ABC analysis has to be followed in the CPWD, if the top management were to really contribute their part in controlling progress of works. Thus, an S.E. may choose only a few works from each division, which, according to him, are the major contributors to the workload in the division in a year or which present special problems. He may particularly concentrate his attention on these works for which he may call for analytical reports. For the other works, reports in a summarised manner for the project or work as a whole need only be received by him. This could enable him to focus his attention on important works in his circle. If works are selected and control exercised, it will be possible for him to make use of the reports and effectively communicate with the operating levels. This does not of course mean that the S.E. will not be concerned with the control of other works. It is up to the Executive Engineer to bring to the notice of the S.E. any problem in respect of any work requiring advice or direction from higher officers. Similarly, a Chief Engineer can select a few important works from each circle and control these works effectively. In any case, the circle offices and the C.E.'s office will not remain in the dark about the progress of any work, as information reports containing the data for the information centre at the Zone will be sent from the data base in the division.

On a study made of the requirements of the CPWD and the client departments, it was found that the reporting system in the CPWD could be structured for three distinct levels, viz., E.E., S.E. and C.E. on the following lines. The Report from the sub-divisions should be brief but comprehensive so as to supply pertinent information to the data base in the division office regarding the progress of all works/contracts during the period under report. Details that ought to be available in the division should be omitted. When reports come from sub-divisions, the data base in the division should process them and segregate information into two parts—one required for control purposes and the other for reporting to the client departments/bodies and higher officers for information. The control reports to the S.E. in the form of milestone charts would be sent by the E.E. after he has incorporated his feedback on the problems encountered. Similarly, information required by the C.E. in an analytical and summarised Chart should be sent by S.E. (from his Reporting unit). Reporting should be selective and based on ABC analysis and the principle of control by exception. The data base in the division should feed the other branches concerned with works, viz., the Architect, Planning, quantity surveying, etc., with information they need. The information required for reporting to the client departments and bodies and higher officers will also be sent from the data base in the division to the S.E. and C.E. Progress reports for clients are to be sent direct by the E.E./S.E./C.E. depending on the nature of the work, the level of attention needed and coordination involved. For receiving and processing data from lower levels and for dealing with information sought by higher authorities, clients and various disciplines in the Zone, an Information Centre should be created in the C.E.'s office. This centre could usefully serve as a Date Bank in answering queries from Parliament and Government. This is particularly important if coordination is to be effectively done.

In Section D of Part II of this study, a simple but effective format for progress reporting and control has been illustrated with a brief note explaining its salient features. The format therein are in use now in one of the Circles of the Department. These are only by way of suggesting the approach and have to be modified or improved upon in individual situations. As and when network techniques are put in use, these may be gradually refined. At the end of Sections A, B, and C of Part II of this study, *i.e.*, Performance Budget illustrations of three divisions. Annexures have also been added, one explaining in brief the existing reports and the other suggesting a tentative format, to start with, for consideration, pending further rationalisation and sophistication.

Contracts

As already stated, most of the works in the CPWD are executed through the agency of contractors. It is also quite usual to split up one work and entrust it to more than one contractor. If the work is to be completed on time, all the participating contractors should do their job to a schedule which is integrated with the overall plan of work. Such an integrated approach to each contract and the contractor's job is necessary, as any delay in any one item in one contract may effect the overall completion of the work in time. A delay in one case might also create hindrances on the progress of other dependent contracts. The completion of a work in time and within the cost estimates, therefore, depends largely on proper planning and coordination of each contract under a work. Also, if one contractor's work is not linked with that of other participating contractors, it is quite likely that he may draw up a time schedule which is to his advantage. Delays on the part of one contractor may give rise to claims for maintaining over-heads for a longer period by other contractors. It will also be quite difficult to invoke the compensation clauses of the contracts in such cases.

The basic step in the awarding of any contract is the issue of Notice Inviting Tender. Detailed time-schedule on the basis of a work plan should first be developed by the department for each contract. The basic objective in drawing up a proper time-schedule of each work is to ensure that the contractor is bound to a well conceived and well coordinated plan. The contractor should operate within the predetermined time-schedule in a coordinated sequence. As suggested in Part III of the Study, the NIT should include time-schedules for completion of significant milestones of stages along with the time for overall completion of the work. However, in case of contracts for bigger works, the contractor may be required to submit a detailed network and schedules for labour and materials before starting the work. Till such time the contractors get conversant with the use of the network technique and are converted to it, the work plan or the network can be drawn by the contractor under the guidance rendered by the department. The work plan subsequently submitted by the contractor should be approved by the department to ensure that it fits in properly in the overall plan of the work. (See also chapter 3 of Part III).

In the CPWD there is usually a clause in the contracts requiring the contractor to complete a given work within the stipulated period. There is provision for compensation, if he fails to complete the work in time. There is also a general provision in the contract requiring the contractor to maintain a certain proportionate progress of the work. However, the time-schedule given to a contractor for the completion of the work is not based on any detailed plan. The time required for the work is determined by the department based on past experience. Further, the general provisions in the contract terms for maintaining proportionate progress do not take into account the nature of work and remain the same for all types of constructions. This is not adequate to enforce compliance in the desired manner.

In order that time and cost factors are properly controlled, there is the need for a mutually agreed network plan or a detailed work schedule being included in the contract document. The schedules should cover procurement of materials and labour also. When once the contract has been awarded and the construction started on the basis of mutually agreed schedules and plans, the authorities will be in a position to check at periodical intervals as to whether the contractor's progress is according to the overall schedule of the work. However, as stated in Part III of this study, it may not be desirable to make networks form part of the contract documents till the whole system is geared and proper atmosphere created. This can be attempted only when contractors change over to network-oriented management system in their own organisations. However, the work plan drawn up by the contractor in consultation with the department should be made binding on both the parties. Further, the intermediate payments to be made to the contractor should also be linked with the completion of certain stages in the work to be stipulated in the contract. These stages should be chosen in a manner that their completion occurs at regular intervals, of say once a month. Instead of commitment for monthly intermediate payments, it should be clearly specified in the contract that the intermediate payments will be made only as and when the contractor completes given stages, which, as stated, will occur normally at an interval of not more than a month. Due adjustments for deviations can be made while making these payments.

The existing provisions in the contracts being used in the CPWD need to be examined in detail and suitably modified to achieve the above. As mentioned earlier, there is usually a compensation clause in every contract intended to reimburse the government for any lapse on the part of the contractor. The contractors generally try to avoid these clauses and frequently claim extra payment by putting the blame on others. If the compensation clause is to be effective, it would be desirable, by and by, to introduce clauses in the contract to determine penalty at some intermediate stages also. Just as compensation is leviable, there should also be provision for a rebate or bonus in cases a contractor does the job at a given point earlier than the specified time.

At present, in the CPWD, three forms of contracts are generally used—percentage rate contract (PWD 7), item-rate contract (PWD 8) and lumpsum contract (PWD 27). The Govinda Reddy Team had emphasised that “the lumpsum form of contract should be increasingly used”. In view of the recommendations of this expert body, it is not proposed to go further into the question of the relative merits of the other forms of contracts over L.S. form. It is a matter which the Government will no doubt examine in all its aspects. The Govinda Reddy Team had also recommended that Government should study the forms of contract in use in other countries also. Notwithstanding the above recommendations, it would be necessary for the department to consider modifications in the conditions of contract as mentioned earlier in order to effectively bind the contractors to pre-determined time schedules.

At present, although there are general instructions to the effect that complete structural and architectural drawings and designs are to be made available along with NIT, this is generally not followed either because the required planning could not be done or the drawings and designs were not made available for one reason or the other before the contract is awarded. Also, works are often required to be taken up in a hurry. It is needless to say that all the subsequent delays and disputes are mostly due to this. It is, therefore, necessary to re-emphasise this aspect. It should be impressed upon all concerned that no work should be awarded unless the complete planning is done and the drawings and designs are made available. It will also be desirable to include a clause to this effect in the contract documents.

If the contractors are to give detailed time-schedules on the basis of a network plan, there may be initial difficulties and resistance due to lack of appreciation on the part of the contractors. Most of the contractors may not also be properly organised for the use of refined techniques like the PERT/CPM. In the transitional stage, therefore, the department should not be very rigid about refinements. To start with, elementary aspects of network could be

introduced and the contractors initiated gradually to greater sophistication. This aspect has been dealt with in Chapter 3 of Part III of this Study. Without network planning and scheduling and without such a plan of action becoming part of the contract, it will not be possible to cut on time and thereby cost.

An important problem which the CPWD is faced with today is the inadequate number of competent and reliable contractors. By and large, they lack technical competence and are not abreast of advancement in technological and managerial methods and practices. A majority of them are mere financiers. Only a few of them employ technical staff as required. Some of the contractors not only lack technical capacity but are also ignorant of the various contract clauses, their implications and obligations. Though in theory it is open to the Department to weed out bad contractors, it is very difficult to follow it in practice for obvious reasons. The moment action is sought to be taken against a contractor, all sorts of pressures are brought in and counter-allegations on the department staff are made. This stands in the way of any action.

The hands of the contractors are further strengthened by the provision for arbitration in cases of disputes. It has become almost customary for contractors to go for arbitration after or even before the completion of work. They are encouraged to do so on the slightest provocation as they have only to gain, if possible, and not much to lose by way of arbitration award or cost. There is always a battle of wits and the atmosphere is spoiled by tension and mistrust. This not only diverts the attention of the field supervising staff from the actual supervision, but also creates unnecessary correspondence work in all the offices. The work becomes more difficult as cases are to be carefully examined and letters carefully worded to obviate possible twisting and consequent arbitrations. In case of defective works it is becoming increasingly difficult, if not impossible, to get them rectified by the contractor and such cases frequently go before the arbitrator. Such an atmosphere is detrimental to progress and performance.

It has thus become necessary to examine how far the arbitration clause is impeding the smooth progress of works and to what extent its misuse could be eliminated. The solution to discourage frequent and frivolous arbitrations by the contractors lies, perhaps, in charging some fee from the contractors on the basis of the monetary value of the claim made. This, however, requires to be examined in detail by Government in all its practical and legal aspects, within the framework of the Arbitration Act.

There are two other aspects regarding contracts. First is the enlistment of proper contractors and the second the weeding out of bad contractors. The problem could, perhaps, be solved by a change in the procedure for enlistment and appraisal of contractors. At the time of enlistment, a careful examination of the capabilities of the prospective contractors should be done. For this, more emphasis has to be laid on the technical competence of the contractors and not merely on their financial standing. For ensuring technical capability, it should be insisted that, at least for major works, the contractors have the required full time technical organisation. Incidentally, this will be a step towards employment of unemployed engineers. The irony at present is that though the engineering potential in the country is lying surplus, hardly any technical staff is kept on the construction jobs by a majority of contractors !

For the economic capability, the contractor should indicate the amount of money he will allot and regularly keep reserved for individual works. What happens, at present, is that although a contractor may be having economic capabilities of a Class I contractor, which is gauged only on the basis of his income tax returns, he may not be able to handle works properly because of the involvement of his capital in many contracts. A limit should also be fixed regarding the number of contracts to be handled by a contractor at a time. The promotion of the contractors to higher class should be done not only on the basis of appraisals but

also on the basis of his technical and economic capabilities.

An important procedural change required in the system is regarding appraisal of the working of contractors. Presently, it is done largely on the basis of subjective reporting by the Executive Engineer, in which the impressions of the reporting officers play a major role. What is needed is an appraisal of capabilities and performance of the contractor in objective terms. The objective reporting formats for assessing the performance of contractors should be so devised that they bring out the economic and technical competence of the contractors. The reports should reveal a correct picture of factual happenings at site. These reports based on facts would definitely strengthen the hands of the department in promotion or demotion of contractors. It should in any case be possible to stop sale of tenders and award of any work to a contractor whose performance on contracts in progress or in the past has not been satisfactory.

Another measure that could be adopted in addition to those stated above, is the method of selective tendering. This procedure is followed in the M.E.S. where works are advertised and applications for obtaining tender documents are invited from the contractors. At this time, the department reserves the right of sale of tender documents which are sold only to those contractors who have not failed in the past.

Measurements and Payments

The system of measurements and payments in case of item and percentage rated contracts and works done departmentally is rather elaborate and cumbersome. Works generally span over a period of time and the department is required to make periodic (usually monthly) payments to contractors. The provisions in contracts envisage that the contractor will submit monthly bills for the work done by him to the department by fixed date. But it is rarely that a contractor follows this procedure and submits his bills. Very often contractors lodge complaints with higher authorities of the department that monthly running account bills are not being paid to them and that the payments are not in proportion to the work done by them. They also threaten to stop work, on the ground that the department failed to comply with its contractual obligation of paying the contractor monthly. This is despite the fact that, as per contract, it is primarily the duty of the contractor to submit the bills and he failed to do it. Even in case monthly bills are submitted by contractors, the verification of amounts claimed, has to be done by the department and bills prepared in the proper form. The codal procedures require that a payment can be made only on the basis of detailed measurements as recorded in the Measurement Books of the department. The provision in the contract requiring the contractor to submit the bill monthly, therefore, seems to be of no relevance in practice, though this responsibility of the contractor cannot, perhaps, be done away with.

The detailed measurements of each item of work along with full nomenclature of the items are to be recorded in the M.B. chronologically by junior engineers. This is to be done as soon as the particular item is completed. Then, an abstract of work done to the date of payment, is made in the M.B. The abstract also contains the full nomenclature of the item, unit rates and total amount. The payment is made on the basis of this abstract. The usual procedure is that quantities and rates as entered in this abstract are checked by the sub-divisional officer at this stage and he is required to test check to the extent of 50 per cent of the financial value of the bill, in order to satisfy himself personally regarding the general correctness of the bills. The bill is accompanied by a number of statements. The Sub-division Clerk (SDC) checks the arithmetical calculations against each individual entry in the bill and later reproduces the entire abstract for payment, on the prescribed bill forms. The bill in the final shape is sent to the division office where again it is checked. Before payment is made, the observations as made by the accounts branch are to be satisfied. The bill may have to be returned to the sub-division office for this purpose. In actual practice a good part of the time of a junior engineer in a month is spent in measurements, preparation of bills and attached statements. As in the case of the E.E., it is necessary that the A.E./J.E. should also concentrate more on supervision. Besides, the SDC in the sub-division has to handle 6 to 8 bills every month, each requiring a lot of time for checking and preparation. This is in addition to his primary duties of maintaining the office records and dealing with correspondence.

Simplification of the system of measurements and payments will save lot of time. All that is required is that timely payments are made and that there are no overpayments. There should also be a check on the quality of work. The present procedure is very elaborate and time consuming. In spite of elaborate procedures, mistakes do still happen, as the entries in M.Bs. are carried over and brought forward and deductions made for past payments. The measurements for one item of work in the same category or unit are recorded at different places and sometimes in different M.Bs. depending upon their occurrence in chronological order and these have to be carried over to the abstract, for payment. If once a mistake has been made and quantities have been incorrectly carried over to one abstract, the mistake lingers till a specific attempt is made to check it, as quantity in a subsequent abstract is the quantity as in the previous abstract plus the quantity for work done after the previous abstract. The position is worse where more than one junior engineer is in charge of a contract and separate entries are made by them in their M.Bs. Also, whenever verifications of quantities under various items in relation to the provisions in the detailed estimate is required, or if the work consists of a number of buildings and the final cost of each building is required or in the preparation of revised estimates for revision of A/A and E/S, the process becomes very combersome. Situations of the above nature can be met by simplifying the procedure of recording measurements and payments.

In L.S. contracts running payments to contractors are made not on the basis of detailed measurements as in the case of item and percentage rate contracts, but as advances for work done and assessed by the A.E./E.E. A certificate by the E.E. regarding the value of work done is considered sufficient. When this is so, it is not understood why for every intermediate payment, detailed and elaborate procedure for measurement and payment has been insisted upon for item and percentage rate contracts. The assessment by the E.E. and his subordinates for purposes of intermediate payments can be done more realistically even under item and percentage rate contracts, thereby simplifying matters, if proper use of network is made. The cost of each activity as worked out during planning can be shown on the activity in the network, or preferably on a Bar chart drawn to a time-scale. Later, when the payments are to be made, the total costs of all the completed activities can be worked out. The payment can be made after taking into consideration this sum and any deviations, shortcomings or deficiencies in the work or in contractual conditions. It will, however, be necessary to give proper notice to the contractor indicating specifically the list of defective works which are not accepted and any contractual obligations that the contractor has failed to fulfil. Precaution should also be taken to ensure that only those activities are considered for payment where work has been done strictly in accordance with prescribed specifications. The pertinent clauses in the agreements may, however, have to be modified to make provision for intermediate advance payments to contractors on completion of pre-determined and specified stages of work or milestones. As earlier mentioned, under the chapter on 'Contracts', these stages can be chosen carefully in a manner that their completion occurs at an interval of a month or so. No commitment should be made by the department to make payment if contractors fail to show required progress. Incidentally, the present provisions for monthly payments suffer from this defect. The payments on final bill should, of course, be made only on detailed measurements recorded in the M.Bs.

Work involved in writing measurements in the M.Bs. can be reduced, if full nomenclature of items is not written every time. Reference to item number in the agreement with suitable indication in brief may, perhaps, be sufficient. This will save time.

It may be argued that the analogy of payments procedure under L.S. contracts may not hold good in the case of item and percentage rate contracts, as adequate planning has gone into the L.S. contracts unlike in the other cases. In the L.S. form of contract, there are very little chances of deviations and, therefore, the assessment of work at any stage, if properly done, may not lead to over payments to any significant extent. The same cannot be said of item and percentage rate contracts where deviations are a common feature and therefore,

payments without measurement are risky. It may further be argued that even if deviations to the date of payment are properly taken note of while assessing the work done, there is every danger of the contractor being overpaid at each stage of payment which could be set right only at the time of final bill. Moreover, the use of network, based on which assessment is sought to be done, may take quite sometime to become a practice.

The procedure suggested earlier on page 29, of course, assumes the use of network. Pending the application of network technique and in view of what is argued above, the best and practical course would be to strike a balance. The first payment may be made on EE's assessment. This will be with reference to a completed stage or milestone. Due note could also be taken of deviations, shortcomings, etc. The second payment and, thereafter, every alternate payment, including the final payment, may be on the basis of actual measurements. As a further precaution, when the work is in the final stages, all payments may be made only on the basis of recorded measurements. This will ensure that the contractor does not get away with possible over payments in case final bills are delayed or are not prepared for one reason or the other. Such a procedure will facilitate quicker payments and reduce clerical work. This will also safeguard against possible over-payments. To the extent necessary, suitable changes may have to be considered in the codal and contractual provisions.

The Govinda Reddy Team had recommended in para 14.9 of their Report that detailed measurements of 5 per cent of the total number of units need only be recorded in cases where not less than 50 units of repetitive type of buildings are constructed. This was a step towards cutting down unnecessary work. This needs early implementation, if not already done.

In the abstract for payment, the sequence of items appearing in the schedule of quantities attached to the agreement, is maintained. The schedule of quantities does not exhibit separately the cost of items under different programmes/activities. The quantities entered there are the total of quantities under an item relating to various units, which may or may not belong to the same activity. In order that the costs of various activities do not get mixed up and can be easily separated, it will be necessary to sanction detailed estimates and award contracts by programmes and activities, *viz.*, estimates for residential and non-residential buildings should be sanctioned separately and should not be combined. Even if these are awarded to one contractor, the activities should be kept distinct and in independent parts thereof. This is essential under performance budgeting.

In the context of the increased stress being laid on the use of L.S. contracts, endeavour should be made to strengthen planning and thereby minimise cases of deviations, etc. These deviations occur either on account of defective planning and estimating, when the estimated quantity may not conform to the drawings or because of changes made by the CPWD officers/client departments subsequent to the award of contracts. Any changes proposed by client departments should be allowed only up to the time detailed architectural drawings are not finalised. Once drawings have been approved by the client department, no changes should be accepted and incorporated till the request to this effect comes from the head of the client department. These should be considered only in exceptional circumstances. Even in such cases, likely repercussions on cost, time and contract should be intimated to the client department before accepting the change.

Enormous clerical work is involved in doing the calculations while writing in the M.Bs. and in the preparation and checking of bills in the sections, sub-divisions and divisions. These calculations not only consume too much time, but also cause mistakes. An auditor in the accounts branch in the divisional office or the sub-divisional clerk in the sub-divisional office has to spend about 3 to 4 days continuously on each major bill. Each auditor handles 5 to 7 bills on an average per month. The situation can be eased to a great extent if these calculations are done on calculating machines. This will not only ensure speed and

accuracy, but will also spare the auditor/SDC of this monotonous work. They could then concentrate on important aspects of checking bills, such as comparison of items with agreements, ensuring proper recoveries and keeping pertinent records up-to-date. In view of the cost involved in providing calculating machines to all sub-divisions/divisions, at least one machine per division could be supplied and suitably augmented if need be later.

Check Measurements and Supervision

The codal provisions require that the A.E./E.E. should check measure 50 per cent and 10 per cent respectively of the total value of work done, measured and billed for in the manner laid down therein. Officers above the level of junior engineer, who are involved in the execution of works, are thus required to share the responsibility for the proper execution of works. These provisions are with a view to keeping a check on the accuracy of measurements, maintaining standard of workmanship and avoiding payments for work either not done or executed in a faulty way. The principle of involving these officers in ensuring standard of work is unexceptionable, but the question is one of meaningful implementation. Check measuring a particular item involves not only the physical verification of measurements recorded by the junior engineer by actually measuring it at site, but also ensuring that the work has been done strictly in accordance with drawings, specifications, estimates and terms of contract. An item of work can be check measured when it has been completed and recorded in the measurement book. Though, an A.E. or E.E. cannot effectively vouch for the workmanship and adherence to specifications, if he was not present at the time when the operations involved in the work were actually done, there are various methods and checks available for ensuring proper execution of works through check measurements. They apply certain criteria to ensure the general soundness of execution and adherence to specifications.

There is, perhaps, a need to look at the question of supervision in a more rational way. What is really to be achieved by supervision is a proper control on cost and time. Cost control is to be largely achieved during the planning stage itself when economy in designs and use of materials can be properly considered. When works are awarded on contract, not much could be done in controlling cost by mere supervision. During supervision, it could be ensured that works are proceeding according to schedule. If an item of work is lagging behind and is likely to delay the overall schedule of the work, cost will rise. In effect, therefore, supervision ensures timely completion of work within cost estimates. To the extent works are delayed, the staff is engaged for correspondingly longer period involving more expenditure by way of departmental charges. Supervision on works in progress should also ensure that works are carried out in accordance with detailed architectural and structural drawings, specifications, estimates and contractual provisions.

Though the junior engineer is the man on the spot to ensure compliance with specifications, etc., both the A.E. and the E.E. are also responsible for proper and efficient execution of works. There is no denying this. They should, therefore, spend larger part of their time at site supervising the work and checking the adherence to the various drawings and specifications.

When works are scattered and are located at different places, it may not, however, be always possible for the E.E. or even the A.E. to make himself available at site as often as he would like to be. What he could, perhaps, do is to make a selective approach and concentrate on the actual execution of important items of work in a contract to ensure that in those cases specifications, etc., are adhered to. In making the selection, the E.E. or the A.E. should pick up such areas as are important from the point of view of the structural soundness of the piece of work. In other words, here again supervision should be with reference to the acknowledged principle of ABC analysis. He should be in a position to discriminate between what is essential and important and what is comparatively unimportant. He should not waste his time on petty things, but, by using discretion based on his experience, concentrate on vulnerable areas. In any case, the ultimate responsibility for the proper execution of work rests on the Executive Engineer. Therefore, though no doubt check measurement of works up to certain financial limits as laid down in the Code is good so far as it goes, the selection of works or areas in a work for effective supervision and check measurement should be done with imagination and on an ABC analysis.

Control and supervision on works start as soon as works are awarded. Important aspects in a work which need attention of A.E./E.E. are approval of layouts, issue of architectural and structural drawings and details, approval of materials, timely supply of materials stipulated in the contract to be issued by the department, intermediate payments to the contractors according to progress of work and award of extra/substituted items and their rates, besides the adherence to specifications. Usually, delays in completion of works occur on account of failure of the department to give due attention to one or more of the aspects mentioned above. Responsibility for each of the above should be clear. The junior engineer is, of course, initially responsible for ensuring adherence to specifications and quality of works. He can hardly contribute to any other aspect mentioned above. The responsibility of the Junior Engineer regarding specifications and quality of work is shared by the A.E./E.E. through their check measurements. In addition, the various other aspects referred to above are to be adequately taken care of by the A.E./E.E. To the extent these are controlled, supervisory persons, *viz.*, A.E./E.E. could be deemed to have contributed their part in efficient supervision of works. This is as important as selective, imaginative and intelligent check measurement.

Workload Norms and Yardsticks

In the CPWD, certain norms and workload have been fixed for different construction and maintenance divisions. These are in financial terms. It would appear that these financial norms do not take into consideration factors like the location and jurisdiction, nature of execution of works, type of contract entered into, extent of supervision required for different types of contract agencies, effect on arrears in accounts returns and records and other related aspects. All these have an important bearing on workload capacity, and unless due weightage is given to these aspects also, the norms, limited as they are being purely in financial terms, may not be quite realistic. Besides, the existing norms of workload need to be revised from time to time, say, at least once in 2 years if not annually, taking into account not only increases in cost of labour, material and other inputs, but also the increasing complexity of construction and the problems involved.

Apart from overall workload considerations, there appears to be no other norms in use to determine the number of persons to be employed for a given works outlay. It is true that a certain norm is fixed for the outlay in a division and there is also a staffing pattern for each division, such as one E.E., one A.S.W. (for larger divisions) a Divisional Accountant, head clerk and other ministerial staff. In determining the staff composition, the nature of the division and the work involved are also kept in view. However, it often happens that the same ministerial staff is retained in a division even when the workload gets reduced. Thus, the same complement of staff is seen retained in a division whether the workload is Rs. 80 lakhs or 40 lakhs. Though it may not be either desirable or practicable to reduce the ministerial staff in a division whenever there is a temporary shortfall of work in any year, their number should be reviewed and reduced or divisions amalgamated, when the workload continuously goes down. At present, when workload reduction warrants it, one or more sub-divisions are closed, but no cut in the strength of a division is generally made. On the same analogy, when the number of sub-divisions is increased due to more workload, the divisional staff should also be augmented on the basis of some norms. This applies to the circle office also when the number of divisions is increased over the usual norms.

By a study of historical data in representative divisions, it should be possible to work out norms for staff in normal divisions which should be periodically reviewed. Similarly, the required staff for normal sub-divisions and circles should also be determined. Work studies should also be made to determine and specify the output per individual for different categories of staff, so that staff requirements could be worked out on some rational yardsticks.

The usual practice is to justify additional divisions or reduce the existing number on the basis of total workload in a year and the number of divisions that could carry that

load. Whenever new works are taken up by the department, the Engineer-in-Chief takes stock of existing workload and applying the monetary norms, allots works to individual divisions according to their capacity. Proposals for additional divisions are made wherever necessary and got approved by the competent authority. Usually, 4-5 sub-divisions come under a division and 4-5 sections under a sub-division. About 4 to 5 divisions make a circle office under a Superintending Engineer. As already stated, there is, perhaps, a need to go into the whole question of workload norms and the desired number of units/staff in each division and sub-division based on output standards for each individual, whether he is an EE or AE or architect, and the support he should have.

The staff Inspection Unit of the Ministry of Finance deals with the question of fixing the staff norms for various organisations and units. It is often seen, however, that the methodology followed by the SIU and the norms evolved by them are not acceptable to the organisations. On the other hand, if the job is left to be done by the department alone, it may be biased and subjective. What could, perhaps, be done is to let the department do the workstudy in close coordination with the SIU of the Ministry of Finance. This will enable the department to bring to bear on its work intimate knowledge of the working of the department with the SIU setting the guidelines and principles and overseeing the whole job. The results of the study could be discussed in a joint meeting. For this purpose, suitable organisation under the E-in-C should be created. The norms should also be periodically reviewed.

In considering norms of output for various categories of staff, the one area that poses special problems is that of the architects. It may be argued that their work is such that it needs imaginative and original thinking, and as such, cannot be bound by any pre-determined standards. Also, they have to plan their work to the satisfaction of the clients. Though it is true that these factors have a part to play in determining their output, nevertheless, it should be possible to work out some kind of manpower utilisation factors in their case also with reference to the time spent in terms of man days and cost incurred for doing the work. Such data on work measurement ratios over a period of time will serve as an indicator of performance and provide the basis for working out percentages of architectural cost to the total works outlay.

CPWD is one of those few departments where natural units of work measure and itemised standard or estimated cost per unit of work are available. Thus, the work done is capable of being measured in specific quantifiable units. Work done is paid for only after measurement. The Schedule of Rates being used by the Department for framing estimates, etc., is really a comprehensive volume containing cost per unit for different items of work as well as labour and material. However, this Schedule of Rates loses much of its charm as the items herein are not updated as regularly as they ought to be. There is usually a big time gap between each revision, by which time, cost factors would have varied considerably. The existing organisation in the zones needs to be strengthened to undertake a continual revision of the Schedule and to bring out new editions at least once in two years so that cost estimates of the department become realistic and responsive to trends in tenders.

It is understood that the CPWD has already undertaken various measures designed to bring about standardisation in drawings, designs, materials and techniques of construction. In respect of the usual repetitive kind of small works, it should be possible to standardise drawings and details as well as model estimates per unit of work region-wise (e.g., cost of compound walls per 100 meters, roads per KM or guard room per number) and make them available to the various divisions. This will reduce time and labour involved in framing the contracts, result in economy in the long run and help in the development of standard costing, to the extent possible, in repetitive types of construction.

A major obstacle that the CPWD faces in anticipating workload and the corresponding

staffing pattern is the uncertainty and delay in the issue of sanctions and the relative importance or priorities attached to them. In the budgets, provisions are made for works in progress as well as for new works. In case of the works in progress, the phasing of the expenditure in the coming years as well as in the years to follow can be done with reasonable accuracy and the staff required can also be worked out. However, the problem arises in the case of new works for which the sanctions may just have come in or are still awaited. On certain anticipations and expectations, the workload of the various divisions is fixed, and, if at the end of the year these are not realised, under or over staffing results. As stated earlier in the Study, substantial time is legitimately required by the CPWD for proper planning and designing before the works can be started and expenditure incurred. Sanctions are often delayed, but works are required to be taken up urgently thereafter by including them in the budget. Sometimes even though the sanctions are awaited, pressure is put on the ministry for including the works in the budget on grounds of extreme urgency, though it is opposed to rules on the subject. This is done on the promise that the required sanctions would be released soon. Under these conditions, it becomes very difficult to sanction and provide timely and adequate staff in the concerned units of the CPWD. Consequently, under or over staffing is a usual feature with the organisation.

The situation can be met, if the client ministries and bodies cooperate with the CPWD and the latter given adequate time at all stages of planning and implementation. Sanctions to preliminary estimates should be expedited and thereafter, reasonable time given to the department to plan their action. Except in very exceptional cases, ordinarily, no budget provision should be insisted upon, if there are no reasonable chances of the work being taken up in the next year. In order that the CPWD may discharge its functions effectively, it is necessary that the quantum of work to be planned and executed by it in the next two-three years to come is known well in time and with sufficient accuracy. Each division/circle or zone should know well in time the projects it has to handle and the dates on which work of planning and execution are likely to start. Without this information, the numbers and location of units cannot be decided nor can targets of performance of each unit laid down. It is thus necessary that the sanctions are given well in advance, and if possible, an year or two in advance, so that proper planning for inclusion of new works in the coming year's programme can be done and their relative priorities decided. For this purpose, it will be necessary to have always on hand sanctions for works about three times the annual work load. This is the consensus in the department. It will also be necessary to fix a time limit for the receipt of sanctions after which the concerned works should not ordinarily be considered for inclusion in the next year's programme.

The efficiency of the CPWD is also judged by the amount of departmental charges it debits to the clients. Whenever, a ministry or body proposes to give works to the CPWD the decision is based on the comparison of such charges levied by the CPWD with the charges of the private architects. Though this is not quite scientific or rational, as the services rendered by the CPWD as well as the supervision done by it on the works are much more than that done by private architects, yet it appears necessary to look into the whole question of the percentage charges on account of departmental charges levied, so as to find out to what extent there is scope for reduction therein. It would appear that there is a case for increasing the departmental charges levied for maintenance works where staff employed is almost three times the number employed for construction works. On the other hand, the charges for construction works could be substantially reduced. To what extent the levy of departmental charges needs rationalisation may be examined by Government. In this connection, suggestions made to do away with T & P charges by debiting cost of T & P to the project concerned and suitably reducing Audit and pensionary charges also deserve consideration.

General Summing Up

As mentioned in the Introductory chapter as well as Annexure I of this Part, the CPWD was selected as one of the areas where the applicability and use of Performance Budgeting in the management of programmes and works could be demonstrated by making a study in depth of the objectives of the organisation, its structure, planning and execution machinery, systems of contracts, measurements and payments, administrative and financial powers and responsibilities at various levels, prevailing norms and standards and the systems of reporting and accounting. Such a study of the various aspects was considered necessary for the introduction of Performance Budgeting in the CPWD, as the technique of performance budgeting is not one of mere conversion of the conventional budget into a new format in terms of functions, programmes and activities. As could be noticed from the brief outline of the concept of performance budgeting given in Annexure II, three basic steps are involved in the introduction of performance budgeting. First, a meaningful classification structure for each organisation has to be established in relation to the objectives of the organisation. Secondly, in accordance with this classification, action has to be taken to ensure the necessary accounting support and the reporting system modernised and strengthened in order that a regular stream of financial and physical data flows for decision making. More important, the prevailing financial, administrative and work procedures and practices need to be streamlined for effective management control. Thirdly, appropriate work units, norms, yardsticks and standards are to be developed in order to appraise performance and establish a relationship between inputs and outputs. Thus, unless these three inter-related considerations are given proper recognition and attention, performance budgeting will not be useful as an aid for management.

It was for this reason that the various aspects of the working of the CPWD were gone into and discussed in this Study. It is not the object of this study to go beyond what is essentially needed to sustain performance budgeting and to make a performance-oriented budget a really operational document. Whatever aspect has been touched here has some bearing on the successful working of the technique. Already, the Buildings Projects Team of COPP, Planning Commission and the Govinda Reddy Team had gone in detail into the efficient and economical execution of works. The accent was on management. Some of their recommendations have either been accepted by Government or are being implemented. This study has taken a note of these developments, but has pointed out areas where improvements are still called for.

Though the establishment of a classification structure may not present insurmountable problems, much needs to be done in rationalising the organisational structure and centres of responsibility, methods of work, assignment of responsibilities consistent with powers and improving the reporting and accounting system. In this Study, attempts have been made to

identify these areas and indicate the possible course of action to improve the administrative and financial management system in general. The success of performance budgeting, as an aid to management, depends, however, on how wisely and effectively a budget on performance basis is made use of by those at various levels in the management. This calls for a built-in system which will permit periodic appraisals and prompt follow-up action to ensure that the performance or accomplishment is in accordance with what was planned and programmed as reflected in the budget. It is hoped that this Study, along with the illustrative performance budgets of the three divisions attempted in Part II and application of Network Technique explained in Part III, will help the department in making a beginning in the installation of the technique in select circles to start with, and to extend the coverage over the entire department gradually by suitably training the concerned officers at various levels. Some of the changes suggested in the financial and administrative practices may take time to be acted upon. The introduction of performance budgeting is not conditional on their immediate implementation, but unless they are gradually improved, the technique may not yield all the benefits to management expected of it.

ANNEXURES

ANNEXURE I

Approach to the Installation of Performance Budget in Central Public Works Department

To supplement the efforts of the Government of India in implementing the A.R.C.'s recommendations regarding performance budgeting and its related aspects, the Financial Management Unit in the I.I.P.A. was strengthened in consultation with the Government of India. There is an advisory committee to guide the formation and operation of the Unit with Shri B. Venkatappiah, as Chairman. The members of the Committee include, among others, the Budget Officer of the Government of India and the Deputy Comptroller and Auditor General.

The programme of studies designed for a smooth installation of performance budgeting in certain selected departments/organisations at the Centre as well as a few States and public sector undertakings involves analysis in depth of (1) the objectives of the organisation; (2) structure of the organisation; (3) administrative and financial powers and responsibilities at the various levels; (4) prevailing norms and standards; and (5) existing accounting and reporting systems with a view to improving the organisational machinery to the extent necessary, evolving a suitable system of financial control and procedures, developing appropriate norms and yardsticks and the building up of a meaningful internal accounting and reporting systems.

The CPWD was selected as one of the areas where the applicability and use of performance budgeting in the management of programmes and works could be demonstrated by making a depth study along the lines mentioned above. It may be mentioned here that the performance budget of the CPWD appearing in the volume 'Performance Budgets of Selected Organisations', prepared for the years 1968-69, 1969-70 and 1970-71 (Separate Volume), was only an attempt in converting the traditional budget along programmes and activities. There is scope for further improvement. This apart, performance budget in the real sense has to be installed in the Department. A mere conversion of the facts and figures from the Demands for Grants into an activity budget as a post-budget exercise does not amount to introduction of performance budgeting as a tool for internal management. Considerable efforts are needed to do this, which *inter-alia*, calls for a thorough study of the working of the Department and its units, analysis of its programmes, building up of data from below and development of suitable work units, norms and standards.

The Division is the executive and accounting Unit in the CPWD. It was, therefore, decided to take up some representative divisions in Delhi doing construction work for a detailed study of their working as well as financial and administrative procedures for developing performance budgeting at the primary unit level in an effective way. This work was to be done by the members of the Unit in close association with the Executive Engineer, his divisional accountant and other officials. As various types of work are handled by the CPWD, such as, construction of residential and office buildings, civil aviation works, road works, construction of food storage godowns, etc., the Unit took up three such typical divisions for a detailed study. It was envisaged that in this study, the Executive Engineer, as the Engineer-in-charge of the programmes and works, has a major role to play in helping the members of the Unit understand the existing procedures and practices for programme management, in

considering application of network techniques and in suggesting areas for improvement.

The study of the representative divisions and the discussions with the Executive Engineers and others would give the members of the Unit an insight into the working of the Department and highlight issues for a detailed analysis. After the study of each division is completed, the draft performance budgets and the tentative progress reporting forms would be discussed with the Executive Engineers. Thereafter, the draft performance budgets of the divisions would be included in Part II of the study, in which Part I would be devoted to an identification of the general issues involved, their analysis and suggestions for suitable improvements or changes in the system to facilitate introduction of performance budgeting. Part III of the Study would be devoted to a consideration of the application of the network technique, while Part IV will contain the summary of recommendations. The Study would be discussed with select officers in the department and the draft finalised in the light of their suggestions. It would then be placed before the top and middle management of the CPWD and other senior officers in Government concerned, with performance budgeting, in a Seminar to be arranged. In the light of the deliberations in the Seminar, the Study would be given a final shape and followed up with the appropriate authorities in Government for such further action as they consider necessary.

It is hoped that the Department would, on the basis of the study, be in a position to introduce performance budgeting in a gradual and phased manner for the entire organisation. Suitable training courses will have to be arranged for this purpose. A practical manual on Performance Budgeting would also be brought out for the guidance of all government departments.

ANNEXURE II

A Brief Outline on the Concept of Performance Budgeting

The Budgetary System in India, as in many other countries, has been designed and developed mainly to facilitate financial and legal accountability of the Executive to the Legislature, and within the Executive, observance of similar accountability on the part of each subordinate agency. The main objective is to ensure that funds are raised and money is spent by the Executive in accordance with and within the limits of Legislative sanctions and authorisations. This aspect of financial accountability is the overriding consideration which permeates the entire budgetary process. Accordingly, the budgets emphasise the financial aspects and do not inter-relate financial outlays with physical targets and achievements. Our present 'conventional' budget (also referred to as 'administrative budget') has a strong bias towards organisations and objects of expenditure. The budget shows itemised details of provision towards salaries, cost of material, etc., under each administrative unit. In this form it has a number of shortcomings, of which four arise out of the system of classification:

- (i) The classification does not permit a proper analysis of the impact of government transactions on the total economy, (this is sought to be remedied by economic classification);
- (ii) It is difficult to see for what broad purposes and objectives, resources are being allocated (functional classification is used to remedy this);
- (iii) It is not helpful as a basis for judging the progress towards the attainment of long and short term objectives as envisaged in the development plans; and
- (iv) It does not serve as an adequate base for informed decision making.

During the past two decades, it was becoming increasingly clear that, in the context of a planned economy and the growing size and complexity of governmental operations, there is a need to reorient our budgetary system to the new developmental responsibilities of management in ensuring fulfilment of Plan objectives. It was felt that the budget should reveal what was proposed to be done in terms of the programmes and activities of Government and how effectively and economically they were realised and not merely the objects on which and the organisations by whom money is spent. In other words, the budget should give a comprehensive picture of the total efforts of Government in its functional fields, the economics of programmes and activities, the results that flow from them and the relationship between inputs and outputs.

The technique of performance budgeting seeks to remedy the defects by highlighting management considerations in budgeting as outlined in the earlier para. The emphasis in performance budgeting is on the accomplishments rather than on the means of accomplishments, on the precise definition of work to be done or service to be rendered rather than on the money spent on the several objects. A performance budget seeks to present the purposes and objectives for which funds are requested, the costs of the various programmes and activities proposed for achieving these objectives and quantitative data measuring the work performed or services rendered under each programme and activity. In essence, performance

budget is a financial and work plan conceived in terms of functions, programmes, activities and projects with their financial and physical aspects closely interwoven in one document.

The performance approach to budgeting is based principally on the use, in budget management, of three inter-related considerations. Firstly, a meaningful classification structure in terms of programmes and activities is established under each function entrusted to an organisation in order to show precisely the objectives of various agencies, the work done by them and the organisational responsibilities. Secondly, the system of accounts and financial management is brought into line with this classification. Thirdly, under each programme and activity, action is taken to establish work units, norms, standards and other performance indicators for appraisal and evaluation of performance. The above constitute the three basic steps in the introduction of performance budgeting, each serving the management needs in part and together forming an important tool for review and analysis.

The classification structure for performance budget involves the identification of (a) functions—broad groupings of operations that are directed towards accomplishing a major purpose of Government (e.g., Defence, Education, Health, Agricultural Development, etc.), (b) programmes—broad categories within a function that identify the end products of major organisations (e.g., Minor Irrigation under Agricultural Development or Control of Communicable Diseases under Health), and (c) activities—segments of a programme that identify homogeneous types of work carried out by lower levels of organisation to produce the end products of a programme (e.g., Sinking of Tube-Wells under Minor Irrigation or Eradication of Malaria under Control of Communicable Diseases). The functional categories are broken down into as many sub-divisions as are found necessary by management.

To illustrate further, one of the broad functions of Government is Transport and Communications. A sub-function thereof is Development and maintenance of Roads. This is one of the major programmes of, say, the State P.W.D. (B & R) branch, the other important major programme being Construction and maintenance of Buildings. Under Development and Maintenance of Roads, a number of programmes are launched, such as Construction of Roads and Bridges, maintenance of Roads, etc. The programme, 'Construction of Roads and Bridges' is divided into sub-programmes, as it is too broad. Thus, there are National Highways, Strategic Roads, Roads of Economic or Inter-State Importance, State Plan Roads, Village Roads, etc. Under each of these, there are activities, such as Construction of New Roads or Missing Links, Construction of major bridges, Improvements to Roads, Widening of Roads, etc. This will be the pattern of a programme and activity oriented classification structure for performance budgeting. There will also be a secondary classification by objects of expenditure with the sources of their financing.*

A budget, which discloses the programmes, activities and projects within a function assigned to a department or organisation, and their costs and results, facilitates management control and provides a firmer basis for integrating budgeting and planning. The Annual Plan, which is a blue print, is translated into an action programme by having a unified classification by purpose and relating expenditure under programmes and projects to work proposed and done. A sound classification structure related to a functional grouping of government transactions with sub-divisions thereof into programmes and activities, suitably integrated with organisations and objects of expenditure, is of basic importance to performance budgeting. Such a classification would improve executive and legislative review and decision making and greatly aid internal financial management.

Introduction of performance budgeting calls for suitable modifications in the accounting

*A reference to the Performance Budget documents of some of the Ministries/Departments of the Central Government will help in understanding the form and pattern of performance budgets being developed in India.

structure to be in alignment with the functions, programmes and activities of the Departments. This work has been entrusted to a Team of Officers set up by the Government of India in accordance with the recommendations of the Administrative Reforms Commission. The work is in progress now. Timely and meaningful accounting data is vital to sustain performance budgeting.

When once meaningful programme and activity classification is arrived at and it is related to the accounting data, attention should be devoted to the third step, *i.e.*, the development of physical measurement units/data and performance indicators for each programme and activity so as to provide the basis for effective management control. The development of unit cost data and productivity measures will enable, over a period of time, the establishment of norms and standards for comparison purposes. These in turn will bring about economy and efficiency in public expenditure.

Broadly speaking, the main purposes sought to be achieved by performance budgeting are:

- (a) the co-relation of the physical and financial aspects of every programme and activity;
- (b) improving budget formulation, review and decision making at all levels of management in Government;
- (c) to facilitate better appreciation and review by the legislature;
- (d) to make possible more effective performance audit;
- (e) to measure progress towards long term objectives as envisaged in the plan; and
- (f) to bring budgets and development plans closer together through a common language.

Although the merits of the techniques of performance budgeting are obvious, its introduction in practice must be approached with caution. Its application assumes the existence of a number of factors or facilities. It requires financial discipline, trained and responsible manpower for budget formulation and execution, a regular and efficient system of recording and reporting financial and physical data and coordination between various governmental agencies and budget making authority.

Performance Budgeting provides no remedy for the administrative deficiencies in the budget process. It is no panacea for the administrative and organisational shortcomings. It is only one of the tools to be properly and intelligently made use of by a well-organised administrative set-up. The concept is most clearly applicable to all developmental activities, projects and repetitive operations that lead to some homogeneous end product or physical output. Its usefulness is somewhat limited in respect of activities that are not measurable in any meaningful manner. It is of course possible even in such non-measurable areas to develop suitable basis to analyse work done and explain performance to judge the effectiveness of money spent. Performance budgeting enables only a quantitative and financial evaluation of programmes and activities. It does not facilitate qualitative evaluation. Quality factor and other aspects such as topographical differences, changes in techniques and work methods, etc., should be borne in mind while drawing any conclusions or forming value judgments out of quantitative data generated.

All the advantages of the technique of performance budgeting cannot be realised all of a sudden. The basic elements of the technique will have to be developed in a gradual and evolutionary manner over a period of time. In particular, accounting reforms is a complex matter and takes time. So also the development of appropriate work units, use of norms

and yardsticks and physical measurement of work involve good deal of effort and experience. Only when the three basic elements are developed, the technique becomes a useful tool for management*.

Modern techniques like cost-benefit analysis, operations research, systems analysis, discounted cash flow, management accounting, network analysis (PERT/CPM) etc., when applied to appropriate situations, will aid management in investment planning and decision making. Though not part of performance budgeting, these are nevertheless useful adjuncts to it, enhancing its utility. In projects and works, for instance, budgeting could be meaningfully related to planning by the application of Network technique.

*For a detailed discussion on the theory and concept of performance budgeting, see 'A Manual for Programme and Performance Budgeting', United Nations, Department of Economics and Social Affairs, 1965 and 'Report of the Study Team on Financial Administration', Administrative Reforms Commission, Government of India, 1967.

ANNEXURE III

Schedule Showing Financial Powers in Respect of Works Delegated to Various Officers of the Central P.W.D.

| Nature of Power | Designation of the Officer | Extent of Power Delegated | Recommendation of A.R.C. |
|--|---|---|--|
| 1. Local purchase of stores not borne on DGS & D rate/running contracts. | Assistant Engineer/Assistant Executive Engineer | — | Chief Engineer should be given full powers to issue propriety article certificates whenever considered necessary. |
| | Executive Engineer | Rs. 2,000 per item subject to a ceiling of Rs. 25,000 per annum. | |
| | Superintending Engineer | Rs. 5,000 per item subject to a ceiling of Rs. 25,000 per annum per Division under the Circle in addition to the powers of the E.Es. | |
| | E-in-C/C.E. | Rs. 25,000 per item without any limit. | |
| 2. Local purchase of stores borne on the DGS & D rate/running contracts. | Executive Engineer | Rs. 1,000 per item subject to a ceiling of Rs. 10,000 per annum | Full powers may be given to Chief Engineers in cases of extreme urgency which cannot brook delay, to make purchases of articles required urgently from whatever source they consider advisable so long as the rates are at par with or within the rates prescribed by DGS & D for the same articles or for articles of similar specifications. |
| 3. Accord of Sanction of Extra items. | Assistant Engineer/A.E.E. | Items of the value of Rs. 250 or 5% of the contract amount whichever is less in respect of contracts accepted by them. Where rates cannot be derived either from Agreement or the standard Schedule of rates, approval of E.E. to the fixation of rates for such items should be obtained. A.Es./A.E.Es. have no powers to sanction extra items in respect of contracts accepted by higher authorities. | — |
| | Executive Engineer | Rs. 25,000 in respect of Schedule and Agreement items. In respect of other items 25% of the contract value subject to a | |

| Nature of Power | Designation of the Officer | Extent of Power Delegated | Recommendation of A.R.C. |
|--|----------------------------|--|---|
| 4. Accord of Technical Sanction to detailed Estimates. | | ceiling of Rs. 2,500. Beyond this sanction of the S.E. would be necessary. | |
| | Superintending Engineer. | Rs. 2 lakhs in respect of both schedule and non-schedule items. | |
| | E-in-C/C.E. | Full powers. | |
| | | Note : (i) These powers should be exercised for technical reasons only; (ii) scale of accommodation and furniture sanctioned by higher authority should not be exceeded; (iii) These powers are in respect of each contract; (iv) These powers will be exercised independently by each authority, i.e., E.E. and S.E. will exercise the powers in addition to those of Assistant Engineer and Executive Engineer respectively. | |
| 5. Acceptance of lowest tender | A.E./A.E.E. | Rs. 5,000 | |
| | Ex. Engineer | (i) Rs. 1,00,000 in Divisions having an A.S.W. | |
| | | (ii) Rs. 40,000 in Divisions not having an A.S.W. | |
| | Supdg. Engineer | Rs. 10 lakhs | No change |
| | E-in-C/C.E. | Full powers. | No change |
| | A.E./A.E.E. | Rs. 5,000 | No change |
| | Ex. Engineer | Rs. 1 lakh | |
| | Supdg. Eng. | Rs. 10 lakhs | |
| | E-in-C/C.E. | Rs. 25 lakhs without the prior approval of the C.W.A. Board. Full powers with the approval of C.W.A. Board. | The ceiling of Rs. 25 lakhs without the prior approval of C.W.A. Board may be raised to Rs. 40 lakhs. |
| | | | |
| 6. Acceptance of Single tender | A.E./A.E.E. | | (i) The ceiling may be raised to Rs. 10,000 under his own authority. |
| | Ex. Engineer | (i) Rs. 5,000 under his own authority | |

| | | | |
|---|--|---|---|
| | | | (ii) No change |
| | | (ii) Rs. 1 lakh with the prior approval of the higher authority under the Note to Para 95 of the CPWD Code. | No Change |
| | Superintending Engineer | (i) Rs. 5 lakhs under his own authority. | No Change |
| | | (ii) Rs. 10 lakhs with the prior approval of the next higher authority under the Note to Para 95 of the CPWD Code. | The ceiling of Rs. 15 lakhs without the prior approval of C.W.A. Board may be raised to Rs. 25 lakhs. |
| | E-in-C/C.E. | (i) Rs. 15 lakhs (without the prior approval of the C.W.A. Board. | No change. |
| | | (ii) Full powers with the prior approval of the C.W.A. Board. | |
| 7. Award of work by negotiations with the lowest tender | A.E./A.E.E. | Rs. 5,000 | |
| | E.E. | Rs. 1,00,000 | |
| | Supdg. Eng. | Rs. 10 lakhs. | |
| | E-in-C/C.E. | Rs. 25 lakhs without the prior approval of the C.W.A. Board. Full powers with the prior approval of the C.W.A. Board. | |
| 8. Award of work by acceptance of a tender other than the lowest. | A.E./A.E.E./Ex. Engr./S.E./C.E./E-in-C | As provided in Para 95(b) of the CPWD Code. In cases where the lowest tender is not accepted, reasons should be recorded confidentially and prior approval of the authority next higher than the one competent to accept the tender should be obtained. In the case of E-in-C/C.E., however, it would not be necessary to obtain such approval for contract upto Rs. 15 lakhs. Prior approval of the C.W.A. Board will, however, be necessary, in respect of contracts amounting to more than Rs. 15 lakhs. | |
| 9. Award of work by negotiations with a tenderer other than the lowest. | A.E./A.E.E./E.E./S.E./E-in-C/C.E. | | |
| 10. Award of work (i) without call of tenders and (ii) by | A.E./A.E.E. Ex. Engineer | Rs. 1,000 Rs. 10,000 | No change May be raised to Rs. 25,000 |

—do—

—dc—

Continued

| Nature of Power | Designation of the Officer | Extent of Power Delegated | Recommendation of A.R.C. |
|--|--|--|---|
| negotiations Abinitio after infructuous call of tenders or with a firm which has not quoted. | Supdg. Engineer E-in-C/C.E. | Rs. 15,000 | May be raised to Rs. 1 lakh for all other than runway works and Rs. 2.50 lakhs for runway works. |
| | (i) Without the prior approval of the C.W.A. Board. | Rs. 50,000 | May be raised to Rs. 5 lakhs for all works and Rs. 10 lakhs for runway works. |
| | (ii) With the prior approval of the C.W.A. Board. | Rs. 50,00,000 | No change. |
| 11. Award of contracts against split-up Sub-heads of work. | A.E./A.E.E./Ex.-Engineer/ Supdg. Engineer/E-in-C/C.E. | Where Sub-heads of projects are split up by the competent authority officers may exercise their normal powers by value for award of contracts for split up portions. | |
| | A.E./A.E.E./ Ex. Engineer/ Supdg. Engineer/ E-in-C/C.E. | Rs. 1,000 Rs. 10,000 Rs. 15,000 Full powers. | |
| 12. Award of additional quantities against abnormally high/low rated items (variations being more than 25% as compared to the estimated rates. | | | |
| 13. Accord of expenditure sanction. | E-in-C/C.E. | | Note: The officers are allowed to award such quantities upto 25% of the quantities stipulated in the agreement in respect of work below plinth level and upto 5% in the case of work above plinth level, beyond that limit, their powers to award such quantities shall be restricted to the monetary limits mentioned above. |
| 14. Write off of infructuous expenditure on construction. | Superintending Engineer. | | Rs. 25 lakhs subject to the condition that in the case of projects costing more than Rs. 2 lakhs, pre-budget financial scrutiny should have been done by the competent authority. |
| | E-in-C/C.E. | | 1% of the contract value subject to a ceiling of Rs. 2,000 |
| 15. Power to sanction advertisement charges. | A.E./A.E.E./ Ex. Engineer. | | 1% of the contract value subject to a ceiling of Rs. 5,000 |
| | | | Rs. 200 each job. |

| | | |
|---|--|---|
| 16. Passing of first and final bills and running account bills. | S.E. E-in-C/C.E. A.E. Executive Engineer | Rs. 60) each job Full powers Rs. 5,000 Full Powers. Note 1: The power will be exercised only by those A. Es./A.E.Es. who are stationed away from the headquarters of the Divisional office and subject to the condition that the cash book is maintained properly. Note 2: The powers will be limited only to bills against contract for value of note more than Rs. 5,000 which fall within the power of sanction of the A.E./A.E.Es. |
| 17. Passing of bills of work charged Estt. | A.E./A.E.E. E.E. | Full Powers. Full powers. |
| 18. Write off of T&P and other articles of which part value has been recovered. | A.E./A.E.E. Executive Engineer Supdg. Engineer E-in-C/C.E. Supdg. Engineer | Rs. 1,500 Rs. 10,000 Rs. 20,000 Full powers. |
| 19. Sanction of payment under Workman's Compensation Act. | E-in-C/C.E. | Full powers. |
| 20. Power to fix standard rates. | Officers of the CPWD | An officer of the CPWD may pass excess over estimates provided that the excess is not more than 5% of the amount sanctioned and that all such cases where the excess so sanctioned makes the total estimate exceed the amount upto which he is empowered to sanction should be reported every month to the next higher authority which |
| 21. To pass excess over estimates. | | |

| Nature of Power | Designation of the Officer | Extent of Power Delegated | Recommendation of A.R.C. |
|---|--|--|--------------------------|
| 22. To accord sanction to expenditure on ceremonies connected with the laying of foundation stones and opening of public buildings. | E-in-C/C.E. | has to satisfy itself about the propriety of the excess sanctioned. Upto Rs. 250 only. | |
| 23. To fix annually the limit of reserve stocks in various Divisions. | E-in-C/C.E. | Full powers. | |
| 24. Grant of extension of time for completion of work. | A.E./A.E.E./Asstt. Electr. Engr. Ex Engineer | Upto 1/3rd of the stipulated period in respect of individual contracts amounting upto Rs. 5,000 (i) Full power in respect of individual contract amounting to Rs. 1 lakh. (ii) Full powers in respect of individual contracts amounting to more than Rs. 1 lakh and upto Rs. 10 lakh provided the delay is not more than 1/3rd of the stipulated period. 2. Each time an extension of time is given in respect of works between Rs. 1 lakh and 10 lakhs the Executive Engineer should record the reasons and send a copy of the order to the Superintending Engineer concerned. | |
| 25. Power to levy compensation on contractors in case of delay in completion of works. | Superintending Engineer Asstt. Engineer/Asstt. Electr. Engr./Asstt. Electr. Engr. Executive Engineer/Electr. Engr. | Full powers. Upto 1/3rd of the stipulated period in respect of individual contracts amounting upto Rs. 5,000 Full powers in respect of individual contracts amounting to Rs. 40,000. Full powers in respect of individual contracts amounting to more than Rs. 40,000 and upto Rs. 5 lakhs provided the delay involved is not more than 1/3rd of the stipulated period. | |

| | | |
|---|-------------------------|--|
| | Superintending Engineer | Full powers subject to the condition that the quantum of compensation once levied by a S.E. shall not be changed without Government approval. |
| 26. Acceptance of Sub-standard works and determination of rates therefor. | Superintending Engineer | Full powers. (In cases where sub-standard work has been accepted by the S.E., a record should be kept on the file on the basis of reduction in rates together with their detailed analysis so that they are made available to audit during their inspections). |
| 27. To make advance payments to Electric Supply Undertakings under the Indian Electricity Act, 1910 for execution of works. | Executive Engineer | Full powers. |
| 28. Award of work on work order (Annual limits). | Ex. Engineer | <p>(i) Divisions under Delhi Central Circle I and Delhi Central Circle II, Rs. 1,50,000 per annum.</p> <p>(ii) Divisions under Delhi Central Elect. Circle No. I & II Rs. 1,50,000 per annum.</p> <p>(iii) other divisions (mainly construction) Rs. 50,000 per annum.</p> <p>The officers should be delegated or be in a position to exercise the same powers whether they are in maintenance division or in construction division unless there are strong reasons to prescribe higher limits for maintenance work and lower limits for construction work. If so, the delegation should be with reference to the nature of work viz., maintenance or construction work and not with reference to division.</p> |
| 29. Employment of Muster Roll labour | | <p>(a) There is no annual monetary limit on the employment of labour on muster roll but following restrictions are operating in the matter :</p> <p>(i) Staff on muster rolls can be employed for a period not exceeding 3 months by the Ex. Engrs. and with the approval of S.E.'s for a period not exceeding 6 months.</p> <p>(ii) In rare cases involving employment of muster roll labour for more than 6 months, but not more than 12 months, the specific</p> <p>The existing restrictions mentioned in (a) may be allowed to continue in order to safeguard against possible abuse. Any special occasion can be met by special relaxation. If, however, substantial departmental construction is undertaken the position can be reviewed.</p> |

| Nature of Power | Designation of the Officer | Extent of Power Delegated | Recommendation of A.R.C. |
|------------------------------------|--------------------------------|--|--|
| | | sanction of the C.E. concerned should be obtained. | |
| | | (b) Muster roll labour has to be employed through employment exchange. | Employment exchanges are not able to provide muster roll labour of type normally required for work especially in case of urgency or in remote or inaccessible areas. Therefore, removal of this restriction will go a long way in the execution of works being taken up departmentally on a large scale or their being executed with greater speed and expedition. |
| 30. Powers of disbursing officers. | Assistant Eng./Asstt. Ex. Eng. | Nil | All Asstt. Engineers/Asstt. Ex. Engrs. in charge of sub-division offices be given the power of disbursing officers. |

ANNEXURE IV-A

Project Status Report

PROGRAMME:..... PROJECT :..... LEVEL :..... DATE OF REPORT :.....

| Sl. No. | Project Component | Critical Activity/ Milestone | Ref. No. | Scheduled Completion Date | Latest Allowable Date | Likely Completion Date | Slack (-) or (+)(Weeks) | Reference to Project Status Analysis |
|---------|-------------------|---------------------------------|----------|---------------------------|-----------------------|------------------------|-------------------------------|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

- Notes: 1. The critical activities/milestones for each principal element of the project are shown here.
 2. The activities which have the greatest—ve slack, among the activities which are likely to be completed next, are identified and reported. The activities under report may not be on the critical path of the entire project.
 3. This report is accompanied by a project status analysis.

ANNEXURE IV-B
Project Status Analysis

FOR PERIOD :.....

DATE OF REPORT :.....

I. Late or Pending Milestones with Project Impact
(Alert System)

- A. Milestone (Name and No.)
 - 1. Description of Problem
 - 2. Impact
 - 3. Action Taken or in Progress
 - 4. Action Required/Recommended
- B. (Similar details as in IA above)

II. Milestones Achieved Late with Project Impact
(Future Outlook)

- A. Milestone (Name and No.)
 - 1. Description of Problem
 - 2. Future Milestones Affected
- B. (Similar details as in IIA above)

III. Late or Pending Milestones without Project Impact
(Same Type of Information as in I Above)

- A. Milestone (Name and No.)
 - 1. Description of Delay from Scheduled Date
 - 2. Positive Slack (Difference Between Likely Completion Date and Latest Allowable Date)
 - 3. Action Taken or in Progress
 - 4. Action Required/Recommended
- B. (Similar details as in IIIA above)

IV. Milestones Achieved Late without Project Impact and Milestones Achieved on Schedule
(For General Information)

- A. Milestone (Name and No.)
 - 1. Schedule Date
 - 2. Actual Completion Date
- B. (Similar details as in IVA above)

ANNEXURE IV-C

Project Cost Report

PROGRAMME : PROJECT..... LEVEL.....
 FOR PERIOD : DATE OF REPORT.....

| Work Performed To-date | | | Project at Completion | | | Remarks |
|------------------------|----------------------------|------------------|-----------------------|-----------------|------------------|---------|
| Planned Outlay | Actual Expendi- ture | Overrun (+) | Original Cost | Revised Cost | Overrun (+) | |
| | | Under run (—) | | | Under run (—) | |
| Overall Project | | | | | | |
| TYPE | } A—32 | | | | | |
| IV | | A—16 | | | | |
| QUARTERS | | B—8 | | | | |
| TYPE | } a—32 | | | | | |
| II | | a—16 | | | | |
| QUARTERS | | a—8 | | | | |
| | | b—16 | | | | |

- Notes: 1. The report compares the actual cost to-date of report with the estimated cost and shows projections in future.
2. The report can be arranged to show cost both by contract or by each major item of work that make up the original project Plan.

ANNEXURE IV-D

Building Project Position

PROGRAMME : PROJECT..... LEVEL.....
 PERIOD OF REPORT : DATE OF REPORT :

ALERT SYSTEM

| S. No. | Project | Critical/Milestones (Problems) | Latest Allowable Date | Minus Slack (Weeks) | Responsible Agency | Reference to Project Position Analysis. |
|--------|---------|--------------------------------|-----------------------|---------------------|--------------------|---|
| 1. | | | | | | |
| 2. | | | | | | |
| 3. | | | | | | |

ANNEXURE IV-E

Project Position Analysis

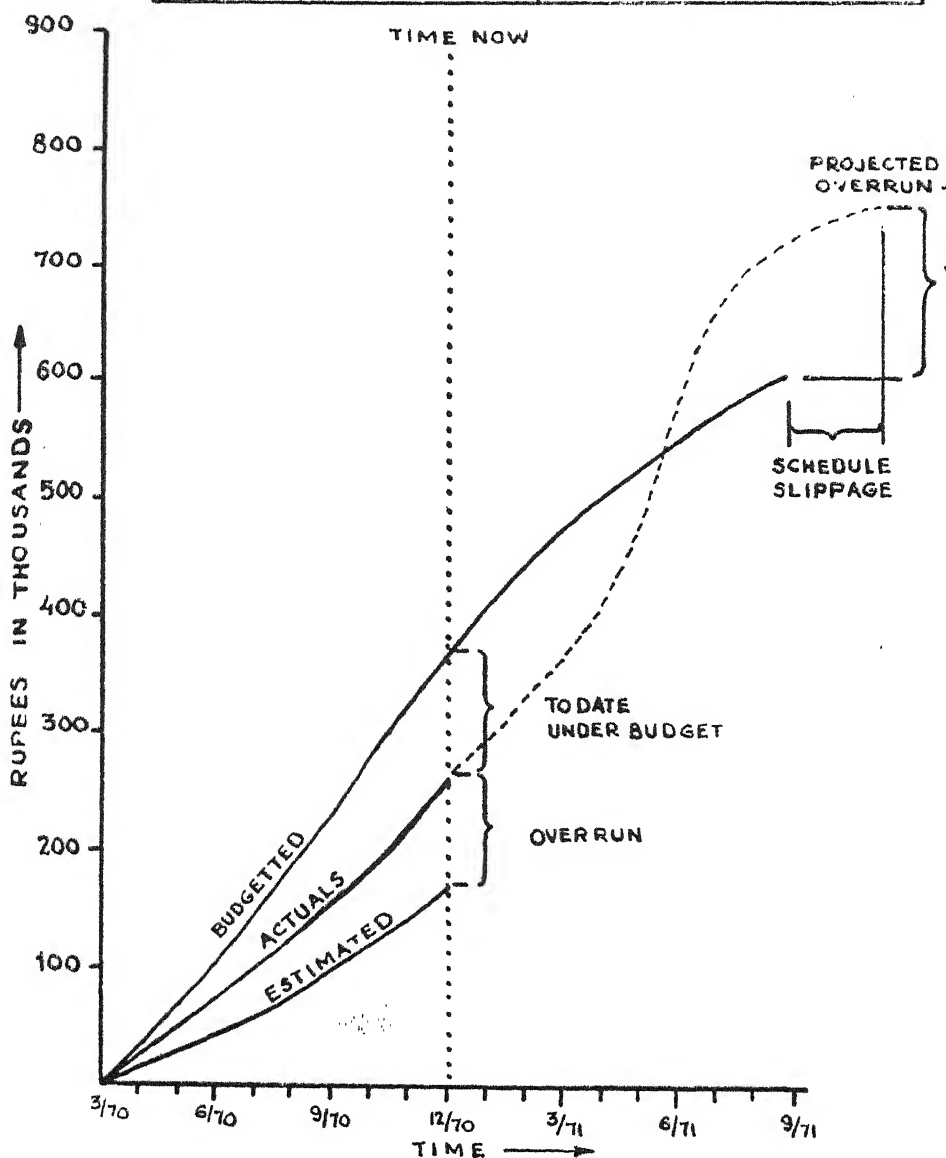
FOR PERIOD : DATE :

| Ref. Project | Critical Milestone | Latest Allowable Date | Estimated Date | Impact (Weeks) |
|--------------|--------------------|-----------------------|----------------|----------------|
|--------------|--------------------|-----------------------|----------------|----------------|

PROBLEM :
 ACTION TAKEN :
 ACTIONS REQUIRED/RECOMMENDED :
 MANAGEMENT DECISION :

ANNEXURE IV.F **PLANNED COST / EXPENDITURE DISPLAY**

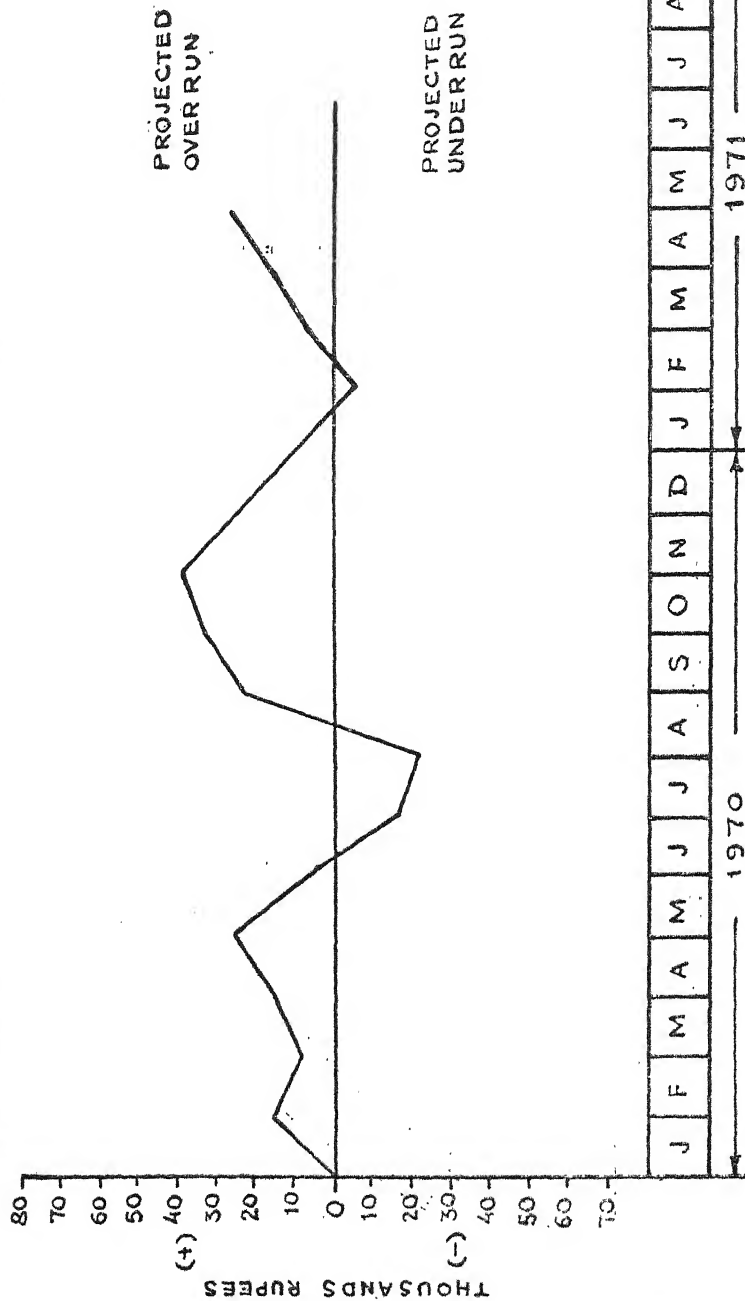
| | |
|-----------|-------------|
| PROGRAMME | REPORT DATE |
| PROJECT | CONTRACT |
| LEVEL | NUMBER |



ANNEXURE IV-G

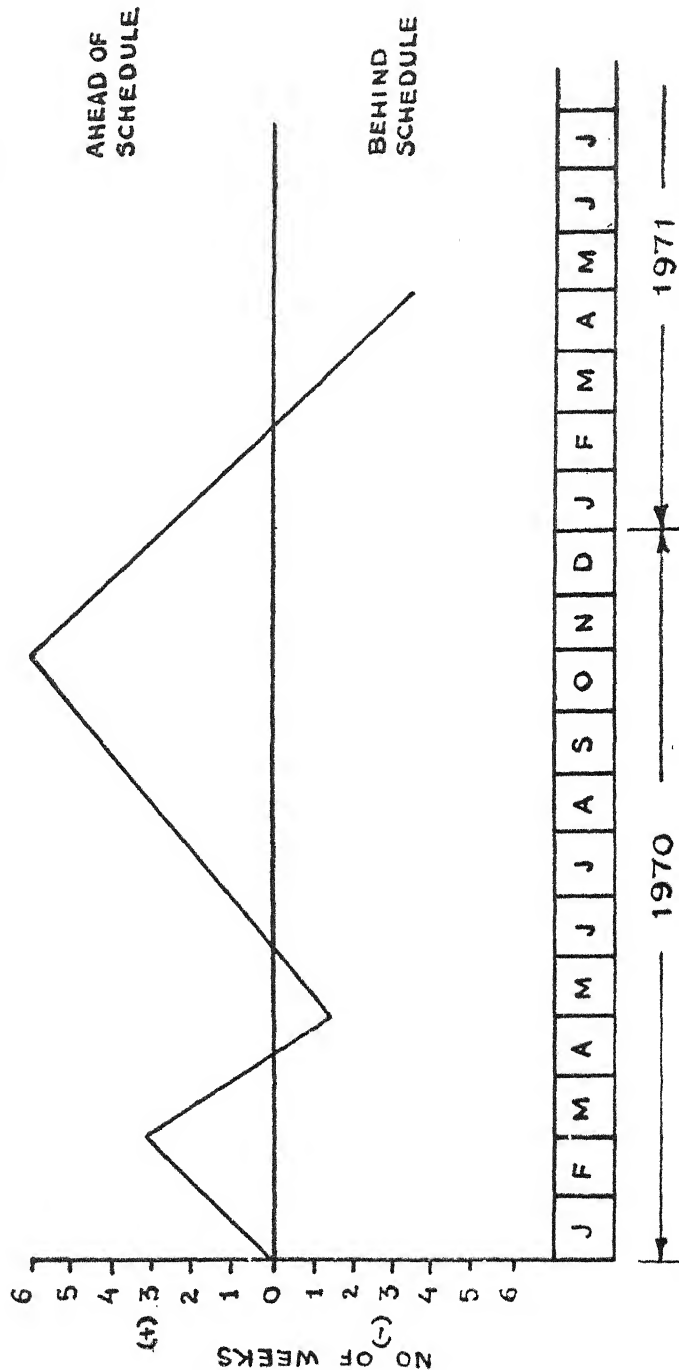
COST OUTLOOK REPORT

| | |
|------------|------------------|
| PROGRAMME: | REPORT DATE: |
| PROJECT: | CONTRACT NUMBER: |
| LEVEL: | |



ANNEXURE IV-H **PROJECT SCHEDULE OUTLOOK / TREND REPORT**

| | |
|-------------|-------------------|
| PROGRAMME : | REPORT DATE : |
| PROJECT : | CONTRACT NUMBER : |
| LEVEL : | |



ANNEXURE IV-I

MILE STONE CHART

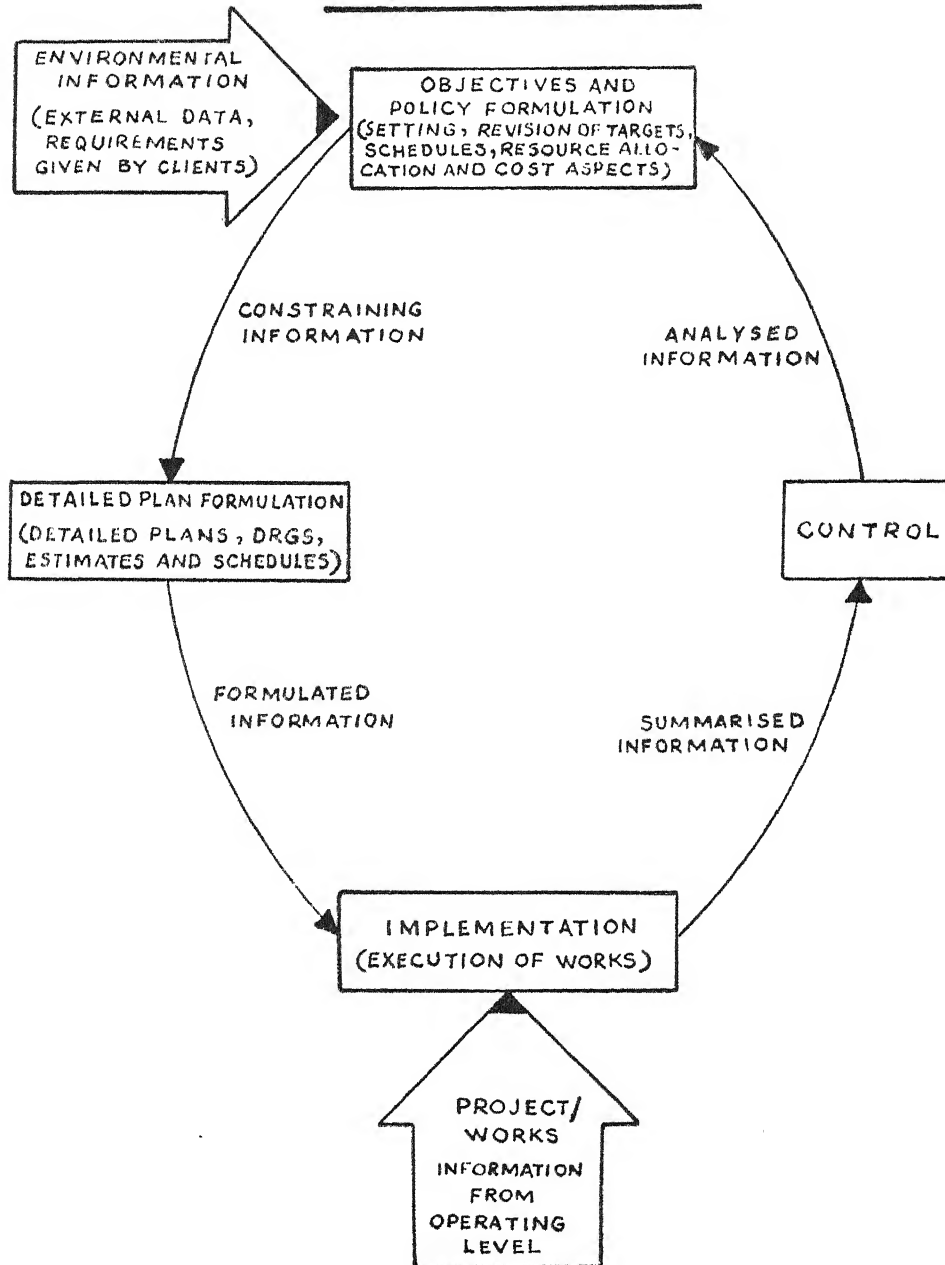
(CONSTRUCTION OF MISCELLANEOUS RESIDENTIAL BLDGS AT SECTOR VIII R.K. PURAM, NEW DELHI)

| DESCRIPTION | 1970 | | | | | | | | | | | | 1971 | | | | | | | | | |
|------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|--|
| | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | |
| T Y P E IV | A - 32 | | | | | | | | | | | | | | | | | | | | | |
| | ▽ 1 ▽ 2 ▽ 3 ▽ 3 ▽ 4 ▽ 5 ▽ 6 ▽ 7 | | | | | | | | | | | | | | | | | | | | | |
| | 8 9 9 10 11 12 13 | | | | | | | | | | | | | | | | | | | | | |
| | ▽ | | | | | | | | | | | | | | | | | | | | | |

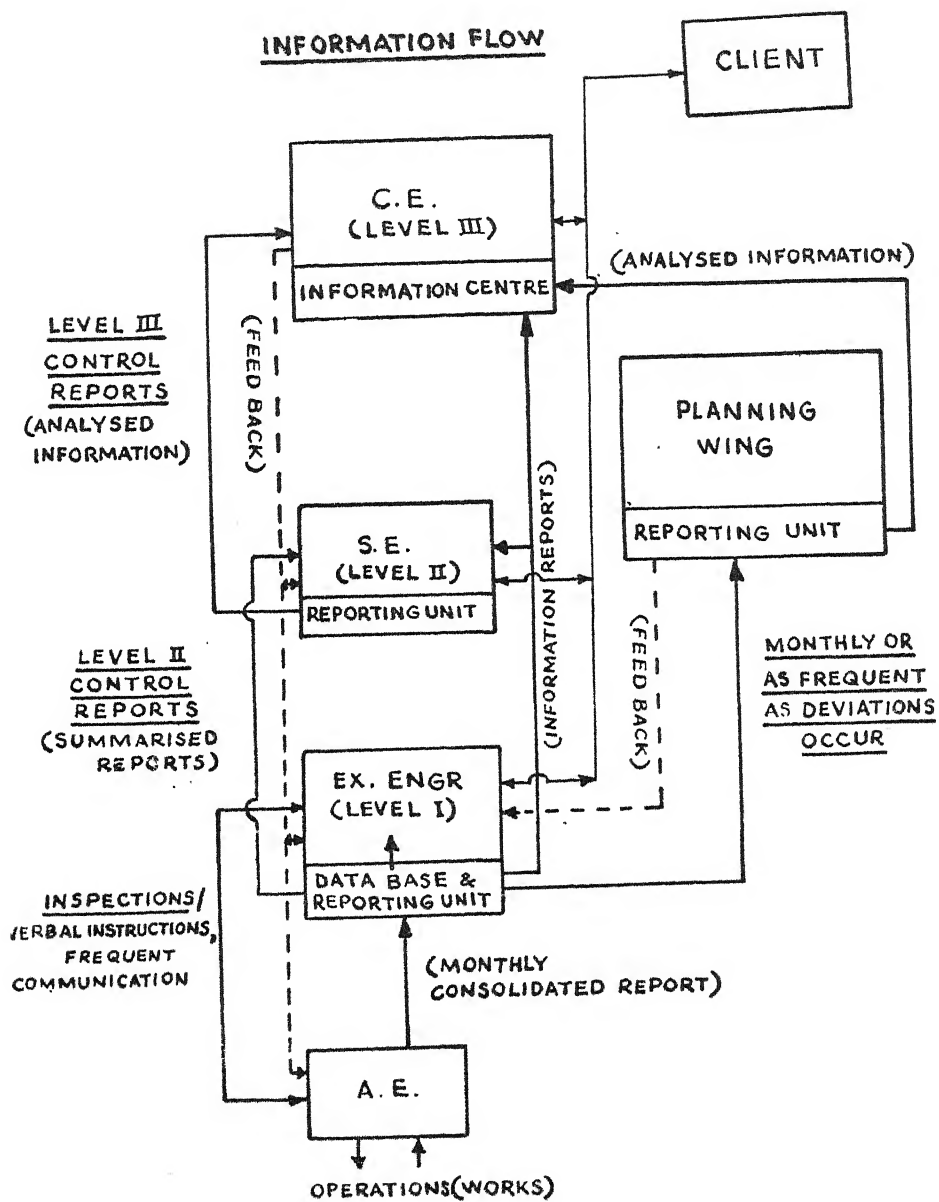
GLOSSARY OF MILESTONES

| | TYPE IV | | | | TYPE II | | | | LEGEND |
|---|---------|------|-----|------|---------|-----|------|--|--------|
| | A-32 | A-16 | B-8 | Q-32 | Q-16 | Q-8 | b-16 | | |
| FOUNDATION COMPLETED | 1 | 8 | 14 | 20 | 26 | 32 | 38 | ▽ = SCHEDULED DATE ▽ = DATE OF COMPLETION | |
| 1ST FLOOR SLAB CAST | 2 | 9 | 15 | 21 | 27 | 33 | 39 | | |
| 2ND FLOOR SLAB CAST | 3 | 10 | 16 | 22 | 28 | 34 | | | |
| 3RD FLOOR SLAB CAST | 4 | | | | | | | | |
| ROOF SLAB CAST | 5 | 11 | 17 | 23 | 29 | 35 | 40 | | |
| FLOORING, PLASTERING AND INTERNAL FITTINGS COMPLETED | 6 | 12 | 18 | 24 | 30 | 36 | 41 | | |
| FINISHING AND FIXINGS COMPLETED | 7 | 13 | 19 | 25 | 31 | 37 | 42 | | |

ANNEXURE V
INFORMATION CYCLE



ANNEXURE V-A



PART II

Introduction

This part contains illustrative performance budgets in respect of the Construction Division No. IV, New Delhi, the Food Storage Division, New Delhi and the Delhi Aviation Division No. II, New Delhi. Section A is devoted to the Performance Budget of Construction Division No. IV, Section B to Food Storage Division and Section C to Delhi Aviation Division No. II. Each Section has two Annexures, one briefly explaining the present reporting system and the other containing tentative formats for reporting, to start with, for consideration pending rationalisation and further sophistication. The deficiencies of the present system have been touched upon in the chapter on 'Information System and Reporting' in Part I. Pending further steps on the application of appropriate "Network" techniques and reports based thereon, a simple and sophisticated format of reporting progress for effecting control has been illustrated in Section D in this Part. The note explaining the format added therein brings out its features. This is based on simple milestone charts. The format is presently in use in one of the Circles in the CPWD. This is recommended for consideration and adoption with suitable modifications to suit individual situations.

A

Performance Budget of Construction Division No. IV 1970-71

I. Introductory

Construction Division No. IV, New Delhi, is under the jurisdiction of the Chief Engineer, New Delhi Zone. The immediate directory control rests in the Superintending Engineer, Delhi, Central Circle No. III. The Executive Engineer is the executive head of the Office and is responsible for the proper and efficient execution of works allotted to the Division and the maintenance of accounts thereof. There are three branches in the Division, viz., Accounts, Correspondence and Drawing.

Matters relating to cash, accounts and audit, preparation of works and establishment budget and returns pertaining thereto are being dealt by the Accounts Branch. The maintenance of CPF and GPF accounts of class IV staff is also the responsibility of this branch.

Receipt, despatch, typing, disposal of establishment cases, procurement of forms and stationery, correspondence relating to works and estimates are the primary functions of the correspondence branch.

The Drawing Branch is entrusted with the duties of preparation, checking and scrutiny of estimates and drawings, preparation of plans and maintenance of Register of Buildings.

The Division comprises five Sub-divisions, each under an Assistant Engineer/Assistant Executive Engineer who is entrusted with the execution of works of the Division. Generally, the Sub-divisions have four Junior Engineers and other subordinate staff. Besides the E.E., there are 4 A.E.s. and 1 A.E.E., supported by 53 regular staff in the Division and the Sub-divisions. There are also 14 work charged employees, since converted into regular establishment and one purely work charged employee.

The average workload for the past three years per annum was about Rs. 40 lakhs against the latest prescribed norm of Rs. 60 lakhs. This shortfall was due to the fact that the Division was engaged, during 1967-68 and 1968-69, on the clearance of old arrears of defunct divisions amalgamated with this Division in the past.

The Division is essentially responsible for the construction of residential buildings besides some institutional and non-residential buildings.

The Financial requirements of the Division for 1970-71 are as follows:

II. Financial Requirements

A. Programme/Activity Classification

| | (Rs. in lakhs) | |
|---|--------------------------------|-------------------------------|
| | Revised Estimate 1969-70 | Budget Estimate 1970-71 |
| 1. <i>Construction of Buildings</i> | | |
| (a) Residential accommodation | 57.04 | 75.80 |
| (b) Institutional and non-residential buildings : | | |
| (i) Medical/Public Health | 1.20 | 0.40 |
| (ii) Adm. of Justice | 0.05 | — |
| (iii) Central Govt. offices | 0.08 | 1.00 |
| (iv) Community Centres | — | 2.00 |
| (v) Shopping Centres | 0.12 | — |
| (vi) Development of land | 5.61 | 0.30 |
| (vii) Other works | 0.86 | 1.00 |
| Total I | 64.96 | 80.50 |
| 2. <i>Deposit works</i> | — | 3.00 |
| 3. <i>Execution and Administration</i> | 3.39 | 3.88 |
| Total A | 68.35 | 87.38 |
| B. <i>Object-wise Classification</i> | | |
| Establishment charges | 1.66 | 1.97 |
| Other charges | 1.65 | 1.83 |
| Tools & Plant | 0.08 | 0.08 |
| Works outlay | 64.96 | 83.50 |
| Total B | 68.35 | 87.38 |
| C. <i>Source of Financing</i> | | |
| Demand No. (Major Head 104, Delhi Capital Outlay) | 64.22 | 79.00 |
| Demand No. (Major Head 50 Public Works) | 0.60 | 0.70 |
| Demand No. (Major Head 97 Broadcasting) | 0.14 | 0.80 |
| Demand No. (Major Head 50 Estt.) | 3.39 | 3.88 |
| Deposits (for deposit works) | — | 3.00 |
| Total C | 68.35 | 87.38 |

Note : In the above Table, Plan and non-Plan expenditures should be separately shown. Figures for B.E. 1969-70 and Accounts 1968-69 should also be given.

III. Explanation of Financial Requirements

1. Construction of Buildings

| | (Rs. in lakhs) | |
|-------------------------------|-----------------------------|----------------------------|
| | Revised Estimate 1969-70 | Budget Estimate 1970-71 |
| (a) Residential accommodation | 57.04 | 75.80 |

Construction of Residential buildings for Central Government staff is one of the main activities of the Division. Among the important works in progress, mention may be made of the following:

- (i) Construction of 416 type II Qrs. in Sectors VIII and XII, R.K. Puram, New Delhi, at a sanctioned cost of Rs. 64.34 lakhs.
- (ii) Construction of 144 type IV flats in General Pool at R.K. Puram, at a sanctioned cost of Rs. 31.22 lakhs.
- (iii) Construction of 80 type IV (4 storeyed) and 8 type IV (double storeyed) quarters in Sector III, R.K. Puram, at a sanctioned cost of Rs. 19.30 lakhs.
- (iv) Construction of 32 type IV, 32 type II, 16 type IV, 16 type II, 8 type IV and 8 type II quarters. in Sector VIII, R.K. Puram, at a sanctioned cost of Rs. 24.00 lakhs.
- (v) Construction of additional bed room to M.P.'s flats at North and South Avenues at a sanctioned cost of Rs. 34.60 lakhs. This project comprises construction of additional bed room in 234 flats, construction of connection corridor in 92 flats and glazing of verandah in 134 flats involving construction of a total floor area of 98,138 sft. in North and South Avenues. This work required accurate advance planning, management and coordination between various agencies, as the work was required to be executed in occupied flats involving the shifting of essential services, viz. water supply, sewer lines, electric cables and telephones cables, etc. without their dislocation for a single day. Upto the end of the year 1969-70, construction of additional bed room in 208 flats, connecting corridor in 28 flats and glazing of verandah in 106 flats covering a total floor area 84,692 sft. was completed. The work is expected to be completed by the end of 1970-71.

The following table will show the programme and performance under construction of residential buildings:

TABLE I

| | No. | Area |
|---|-----|----------------|
| (a) No. and area of residential units in progress at the end of 1968-69 .. | 416 | 2.80 lakhs sft |
| (b) No. and area of New Residential units programmed/taken up in 1969-70 .. | 344 | 3.74 „ |
| (c) No. and area of Residential Units completed in 1969-70 | Nil | Nil |

- (d) No. and area of New Residential units proposed to be taken up in 1970-71 .. Existing work to be completed.
- (e) Average cost* of construction per sq. ft. (Rs.)
- | | | | | | |
|------------------|-----|-----|----|-----------------------------|--|
| | | | | As per estimates 1969-70 | As per anticipated cost 1969-70/1970-71 |
| Type II quarters | ... | ... | .. | Rs. 22.35 | Data could not be |
| Type IV quarters | .. | .. | .. | Rs. 22.35 | readily had. |

The schedule given at the end shows the financial and physical progress of works under this activity. The increase in the B.E. 1970-71 is mainly due to the increased tempo of work.

(b) *Institutional and Non-residential Buildings*

| (Rupees in lakhs) | |
|-----------------------------|----------------------------|
| Revised Estimate 1969-70 | Budget Estimate 1970-71 |
| 7.92 | 4.70 |

(i) to (v): The works under this activity consisting of Medical/Public Health, Administration of Justice, Central Government Offices, community centres and shopping centres are nearing completion. The provision in the Revised Estimates, 1969-70 and Budget Estimates, 1970-71 is mainly for balance payments and adjustments in accounts. During the year 1970-71, the following works are likely to be taken up:

- (a) Construction of C.G.H.S. dispensary in N.H. II and IV, R.K. Puram, approximate cost Rs. 3.52 lakhs;
- (b) Construction of Community Centre in N.H. IX, R.K. Puram, approximate cost Rs. 6.21 lakhs;
- (c) Development of Institutional plots on Brig. Hoshiar Singh Road, New Delhi.

(vi) *Development of land:* This Division is entrusted with the development of 480 acres of land in N.H. VIII to XIII at R.K. Puram, New Delhi at a sanctioned cost of Rs. 78.13 lakhs. The Development of Sectors, VIII, IX, XII and XIII was taken up in 1965-66 and is in progress. The development of these sectors could not be completed, as the layout plan was under revision and was to be approved by M.C.D. which could only be done in 1969. The Development of Sectors X and XI could not yet be taken up as the layout plan for these sectors is still under preparation. The development of the remaining portions in Sectors VIII, IX and XII is being taken up during the year 1970-71 and is expected to be completed by March 1971.

Development of land at Shopping Centre, Malcha Marg at a sanctioned cost of Rs. 1.54 lakhs was taken up in the year 1969-70 and completed on priority during the same year.

During 1970-71, it is proposed to take up the development of land for International Commission of Irrigation and Drainage in D. E. Area at an approximate cost of Rs. 1.5 lakhs.

*Including water supply and sanitary installation, electrical installations and external services but excluding cost of development.

(vii) *Other works* : During the year 1969-70, work of construction of Staff Training Institute of All India Radio (Phase III) was completed. The provision for the year 1970-71 is for finalisation of accounts and for construction of Cafeteria building which could not be taken up earlier due to non-approval of building plans by M.C.D.

2. *Deposit Works*

| (Rs. in lakhs) | |
|--------------------------------|-------------------------------|
| Revised Estimate 1969-70 | Budget Estimate 1970-71 |
| — | 3.00 |

A Guest House for Manipur State at an estimated cost of Rs. 5.6 lakhs is proposed to be taken up in 1970-71 as a deposit work and a provision Rs. 3 lakhs is made for this purpose. Approval of layout and building plan is awaited from M.C.D.]

3. *Execution and Administration*

| (Rs. in lakhs) | |
|--------------------------------|-------------------------------|
| Revised estimate 1969-70 | Budget estimate 1970-71 |
| 3.39 | 3.88 |

This head includes expenditure on officers and staff of the entire Division/Sub-divisions engaged on supervisory and administrative work. It also includes house keeping expenses. The table below shows the staff position and workload.

TABLE II

| | 1968-69 | 1969-70 | 1970-71 expected |
|---|---------|---------|---------------------|
| (a) No. of officers as on 31st March | | | |
| (i) Executive Engineer | 1 | 1 | 1 |
| (ii) Asst./Engineers/Asst. Executive Engineers | 4 | 5 | 5 |
| (b) No. of staff as on 31st March : | | | |
| (i) Division | 23 | 23 | 23 |
| (ii) Sub-Divisions and Sections | 40 | 44 | 44 |
| (c) No. of work charged staff during the year (Av) | 1 | 1 | 1 |
| (d) Work load during the year (Rs. lakhs) | 34.60 | 64.96 | 80.50 |
| (e) Prescribed norm for workload (Rs. lakhs) | 52.00 | 60.00 | 60.00 |
| (f) Percentage of expenditure on execution and administration to works outlay | 10 | 5.2 | 4.8 |

Note : The contents of this illustrative performance budget could be improved upon by the Department with more meaningful data.

ANNEXURE I

Note Showing Progress Reports Currently in use in Construction Division IV, New Delhi

(a) From Sub-Division to the Division

1. Progress Report of Works (Monthly)

(Shows name of work, estimated amount, date of start, target date of completion as per agreement, amount put to tender, progress of last month in percentage, progress of current month in percentage total in percentage and remarks).

(b) From the Division to Higher Officers

1. Return showing progress report regarding Construction of Residential/Office accommodation in general pool in Delhi/New Delhi (monthly) to S.E.

(Shows name of work, number of quarters in progress, amount of A./A. and E./S., date of start, target date of completion, percentage of progress—(a) building, (b) water supply and remarks).

2. Progress Report for sanctioned major works (monthly) to E-in-C with copy to S.E. and C.E.

(Shows name of work, estimated cost as per A./A. and E./S. with date of issue of financial sanction, amount and date of technical sanction of estimate, date of approval of NIT, date of commencement, physical progress up to the end of previous month and upto-date in percentage, budget provision during current financial year, expenditure upto the end of the month under report, probable expenditure for remaining part of the year, total expenditure during the year, date of completion as per contract, target date of completion, whether by contract or department, remarks as to whether works are being executed according to schedule, if not reason for delay, and name of State). This return is sent ministry-wise separately for sanctioned works in progress and works yet to be started.

3. Progress Report of Works costing above Rs. 10 lakhs (monthly) to S.E.

(Shows name of work, stipulated period of completion, target date of completion, reasons for delay, steps taken to accelerate progress, up to date progress in percentage and revised target date).

4. Progress of Works costing Rs. 5 lakhs and above relating to works of Ministry of W.H. & U.D. (monthly) to S.E.

(Shows name of work, number and date of A./A. and E./S., date of award of work, date of commencement of work, target date of completion of work, revised target date, percentage progress of work, total progress in percentage, actual date of completion and remarks).

5. *Details of Projects costing over Rs. 50 lakhs which are in progress for the quarter ending (Quarterly) to S.E.*

(Shows name of project, amount of preliminary estimate, date of A./A. and E./S., date of start of project, whether proceeding according to schedule, if not reasons for delays and steps taken to accelerate progress).

6. *Details of Projects completed during the quarter ending—costing over Rs. 50 lakhs (Quarterly) to S.E.*

(Shows name of project, sub-head, provision in the estimate administratively approved, agreement amount, gross amount of extra items sanctioned, net amount of substitutions carried, total and remarks). Details to be given sub-head wise.

7. *Return of Plan works for quarter ending (Quarterly) to S.E.*

(Shows demand and major headwise details of works, estimated cost, date of commencement, expenditure incurred upto this quarter, progress upto the present quarter in percentage, foreign exchange if any, required, bottlenecks, if any, in the progress and remarks).

8. *Monthly Summary for the Cabinet (Monthly) to S.E.*

(Shows works awarded during the month, works sanctioned during the month, works completed during the month and any important event during the month).

9. *Statement of major contract works of the value of Rs. 5 lakhs and above (Monthly) to CTE, S.E.*

(Shows name, cost put to tender, date of start and name of contractor).

10. *Expenditure return (Monthly) to S.E.*

(Shows major head and sub-headwise expenditure to end of previous month, during the month and to end of the month).

TENTATIVE FORMATS SUGGESTED

ANNEXURE II-A

Monthly Progress Report of Works from Sub-divisions to Division

Division :

Sub-Division :

Programme: Construction of Buildings

Activity/Project: Residential Buildings

| S.No. | Details of work | Progress | | | | | Probable date of completion | Remarks (bottlenecks, remedial action, completion of specific items in individual blocks or units etc. to be indicated). |
|-------|---|------------------------|-------------------------------|-----------------------------------|--------------------------------------|------------------------------------|-----------------------------|--|
| | | Stages | Progress to end of last month | Progress during the current month | Progress to end of the current month | Likely progress to end of the year | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1. | (i) Name | I. Foundation | | | | | | |
| | (ii) Qty/Units involved | II. Superstructure | | | | | | |
| | (iii) Job No. | III. Roofing | | | | | | |
| | (iv) Agreement No. & Amount | IV. Flooring | | | | | | |
| | (v) Date of Start | V. Finishing | | | | | | |
| | (vi) Date of completion as per contract | VI. W/S and S/F | | | | | | |
| | | VII. External services | | | | | | |
| | | Overall Progress | | | | | | |

Notes: 1. The above report is for each contract in a work, i.e., each contract will be given a separate Serial No.

2. Separate progress reports to be sent for each activity as in the performance budget (e.g., Residential buildings, Non-Residential buildings, etc.)

3. Under each activity, Plan works should be distinguished from Non-plan works.

4. As stages of work may be different for different classes of work, the stages have to be determined by the E.E. in each case to be in conformity with work breakdown structure in Network (PERT/CPM). What is given in the proforma is only illustrative.

5. This R report will be supplemented by a brief narrative indicating position regarding labour, material, plant, machinery and their anticipated requirements (phased). Special problems and critical activities should be specially brought out.

ANNEXURE II-B

Monthly Progress Report of Works from Division to Circle Office (for Control Purposes)

(In respect of Important Selected Works)

Circle: Programme: Construction of Buildings
 Division: Activity/Project: Residential Buildings

A—Financial

| S. No. | Name of work/project | Main Sub-heads (major components) | Cost as per A.A. & E.S. cost | Anticipated cost | Expenditure to end of previous year | Budget provision in the current year | Expenditure to end of current month during the year | Likely expenditure remaining part of the year | Total likely expenditure in the year (8+9) | Reasons for variance (Cols. 7 & 10) | Total likely expenditure to end of the year (Cols. 6+10) | Commitment for future years | Remarks (Cost runs (+) or short falls (—) to date of reporting should be briefly explained here) |
|--------|----------------------|-----------------------------------|------------------------------|------------------|-------------------------------------|--------------------------------------|---|---|--|-------------------------------------|--|-----------------------------|--|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |

1.

2.

3.

4.

5.

B—Physical

| S. No. of work/project | Qty/units involved | Main stages or milestones in the work/project | Date of A.A. of & E.S. T.S. | Date of start | Target Date of completion | Programme & Progress (%) | | | | | | Brief reasons for variations taken/ (Cols. 10 & 14) | Expected date of completion | Remarks | | | |
|------------------------|--------------------|---|-----------------------------|---------------|---------------------------|------------------------------------|--|----------------------------------|--|---|---|---|-----------------------------|---------|------|------|------|
| | | | | | | Total progress to end of last year | Targeted progress to end of current year | Progress to end of current month | Expected progress to end of quarter ending (9) | Expected progress to end of quarter ending (13) | Expected progress to end of the year (14) | | | | | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) |

1.

2.

3.

C—Critical Areas

(Here, the E. E. should explain important factors retarding the progress of work, position regarding materials, labour, land and machinery, suggest appropriate significant action and seek necessary guidance and help. In particular, if the contract is hindered due to delays on the part of the department in making supplies available or any other lapse, this should be specifically brought to notice. Similarly, problems of coordination should also be discussed).

Notes :

1. The progress reports should be activity-wise as adopted for performance budgeting (*i.e.*, Residential building, non-residential buildings, etc.)
2. Plan and non-plan works should be segregated.
3. The stages/milestones will be determined by the E.E. depending on the nature of work and with reference to work breakdown structure, in the network (PERT/CPM).
4. For purposes of expenditure control from a purely budgetary angle in terms of Demands, Major Heads, Minor Heads and Sub-heads, the monthly expenditure return as is being sent now may have to continue so long as the budgetary heads are not refashioned on activity basis.
5. For control of select works, S.E. may, if necessary, obtain progress contract-wise under each work. Col. 2 will have to be elaborated for this purpose.
6. In addition to reports to S.E. and C.E., the Data base will send suitable reports to Senior Architect, S.S.W. and S.E. (Planning)

ANNEXURE II-C

Monthly Progress Report of Works from Division to Circle Office (For Control Purposes)

(In respect of all works other than important selected works)

Circle:

Division:

Programme: Construction of Buildings

Activity/Project: Residential Accommodation

| S. No. | Name of work/project | Cost | | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) |
|--------|----------------------|--------------------|------------------------------|-----|-----|-----|--|---|--|---|---|--|---|---------------------------|---|---------------------------|---------------------------|---------|
| | | As per A.A. & E.S. | Anticipated cost | | | | | | | | | | | | | | | |
| | | | Expendr. to end of last year | | | | Physical progress to end of last year(%) | Anticipated expendr. to end of current year | Anticipated physical progress to end of current year (%) | Expendr. to date of report (to end of current month under report) | Progress to date of report (to end of current month under report) (%) | Cost overruns (+) or short-falls (—) to date of report (%) | Variance in progress to date of report (%) (+ or —) | Reasons for cost variance | Reasons for variance in physical progress | Target date of completion | Likely date of completion | Remarks |

1.

2.

3.

4.

5.

Note: A general narrative should accompany this Report highlighting critical areas or specific problems for action by S.E. and superiors. The Report should be activity-wise and works grouped accordingly. Plan and non-Plan works should be exhibited separately.

ANNEXURE II-D

Monthly Progress Report of Works from Division to the Zonal Chief Engineer (for Information of Clients)

Division:

Circle:

Programme: Construction of Buildings

Activity/Project: Residential Accommodation

| S. No. | (1) | (2) | Cost | | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | Remarks |
|--------|-----|-----|--------------------|------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|---------|
| | | | As per A.A. & E.S. | Anticipated cost | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

1.

2.

3.

4.

5.

Note: A general narrative should accompany this Report bringing out important issues having a bearing on the progress of work. Problems of labour, material, machinery, land and changes or revisions sought by the client should be highlighted.

B

Performance Budget of Food Storage Division 1970-71

I. Introductory

Food Storage Division, New Delhi, is under the jurisdiction of Chief Engineer (Food). The immediate directory control rests in the Superintending Surveyor of Works (Food), New Delhi. The E. E. is the head of the office and is responsible for proper and efficient execution of works allotted to the division and the maintenance of accounts thereof.

The Division comprises four sub-divisions, each under an Assistant Executive Engineer/ Asstt. Engineer who is entrusted with the execution of works of the division. The sub-divisions are located at Delhi, Hapur, Bina and Jaipur. Besides, there is a planning sub-division at headquarters under an Assistant Engineer. The sub-divisions have Junior Engineers and supporting staff. Besides the Executive Engineer there are 5 A.Es. supported by 52 regular staff in the division/sub-divisions.

The division is mainly responsible for the construction of food storage godowns in the area under its jurisdiction (*i.e.*, Delhi, U.P., M.P. and Rajasthan) on behalf of the Department of Food and two public corporations, *viz.*, Food Corporation of India and Central Warehousing Corporation. In the case of the Corporations, the works are financed by deposits advanced by them. The bulk of the work done by the division is on their behalf (around 75% in 1969-70 and 80% in 1970-71 proposals). Besides, construction of allied buildings and works and maintenance and repairs also form part of the work of the division.

The financial requirements of the division for 1970-71 are given as under :

II. Financial Requirements

A. Programme/Activity Classification

| | Revised Estimate 1969-70 | (Rs. in lakhs) Budget Estimate 1970-71 | | |
|---|-----------------------------|--|------------------------|--------|
| | | Works in progress | Works to be started | Total |
| 1. Construction of Food storage godowns | | | | |
| (a) Deptt. of Food* | 14.51 | 2.90 | 2.00 | 4.90 |
| (b) Food Corpn. of India | 38.60 | 65.20 | 53.80 | 119.00 |
| (c) Central Warehousing Corporation* | 13.13 | 6.50 | — | 6.50 |

*Deposit works.

(Rs. in lakhs)

| | Revised Estimate 1969-70 | Budget Estimate 1970-71 | | |
|---|-----------------------------|----------------------------|------------------------|--------|
| | | Works in progress | Works to be started | Total |
| 2. Construction of allied buildings and works | | | | |
| (a) Department of Food | — | 3.00 | — | 3.00 |
| (b) Food Corpn. of India* | — | — | — | — |
| (c) C.W.C.* | — | — | — | — |
| 3. Maintenance and Repairs | | | | |
| (a) Godowns: | | | | |
| (i) Deptt. of Food | 2.02 | 0.11 | — | 0.11 |
| (ii) FCI* | 1.30 | 1.00 | — | 1.00 |
| (iii) CWC* | 0.05 | — | — | — |
| (b) Allied Buildings & Works | | | | |
| (i) Deptt. of Food | — | — | — | — |
| (ii) FCI* | — | — | — | — |
| (iii) CWC* | — | — | — | — |
| 4. Execution & Administration | 3.26 | 3.19 | — | 3.19 |
| Total A | 72.87 | 81.90 | 55.80 | 137.70 |

B. Object-wise Classification

| | | | | |
|-------------------------|-------|---|---|--------|
| Establishment charges | 2.72 | — | — | 2.72 |
| Travel | 0.35 | — | — | 0.28 |
| Other charges | 0.19 | — | — | 0.19 |
| Maintenance and repairs | 3.37 | — | — | 1.11 |
| Outlay on works | 66.24 | — | — | 133.40 |
| Total B | 72.87 | — | — | 137.70 |

*Deposit works.

C. Sources of Financing

| | (Rs. in Lakhs) | |
|---|--------------------------------|-------------------------------|
| | Revised Estimate 1969-70 | Budget Estimate 1970-71 |
| 1. Demand No. (Major Head 31 Agriculture) | 0.01 | 3.07 |
| 2. Demand No. (Major Head 124 Capital outlay on schemes of Govt. Trading) | 2.01 | 0.04 |
| 3. Demand No. (Major Head 109 Capital outlay on other works) | 14.51 | 4.90 |
| 4. Deposits (for deposit works) | 53.08 | 126.50 |
| 5. Demand No. (Major Head 50 Public Works, etc.) | 3.26 | 3.19 |
| Total C | <u>72.87</u> | <u>137.70</u> |

Notes:

1. Plan and Non-Plan provisions should be distinguished in the above Section II, Financial Requirements.
2. In addition to figures for RE 1969-70 and BE 1970-71 actuals for 1968-69 and BE for 1969-70 should also be given.
3. Demand Nos. to be filled in "C—Sources of Financing".

III. Explanation of Financial Requirements*1. Construction of Food Storage Godowns*

| | (Rs. in lakhs) | |
|--|--------------------------------|-------------------------------|
| | Revised Estimate 1969-70 | Budget Estimate 1970-71 |
| | 66.24 | 130.40 |

The main activity of the division is the construction of Food Storage godowns in the area assigned to it. The object of the storage construction programme is to build up storage capacity for holding buffer stocks of essential foodgrains. A phased programme of storage is undertaken by the Department of Food, the Food Corporation of India and the Central Warehousing Corporation. The Division handles construction work on behalf of these three agencies. In the case of the Corporations, the works are financed by advance deposits made by them.

Consequent to the transfer of works relating to storage of foodgrains to the F.C.I., the godowns belonging to the Department of Food have also been transferred to the Corporation. As such, the construction work now in hand on behalf of the Food Department is confined to completion of godowns already taken up.

The following table shows agency-wise details of construction outlay, storage capacity created and average cost of construction since 1968-69.

TABLE I

| Agency | 1968-69 | | | 1969-70 | | | | 1970-71 | | |
|---------------|------------------------|------------------------------------|---|------------------|-----------|--|--------|---|------------------|--|
| | Actual outlay (Rs.) | Storage capacity built (tonnes) | Average cost of construction per tonne (Rs.) | Budget Provision | | Storage capacity built (tonnes) Targetted | Actual | Average cost of construction per tonne (Rs.) | Budget provision | Storage capacity to be built tonnes |
| | | | | Original | Revised | | | | | |
| 1. Food Dept. | Nil | Nil | N.A. | — | 14,51,296 | 30,000 | 30,000 | N.A. | 4,90,000 | N.A. |
| 2. F.C.I. | 28,95,107 | 25,000 | N.A. | — | 38,59,591 | 23,500 | 12,500 | N.A. | 1,19,00,000 | 70,000 |
| 3. C.W.C. | 3,45,550 | 1,000 | N.A. | — | 13,12,682 | 15,000 | 15,000 | N.A. | 6,50,000 | N.A. |

N.A.—Not Readily available, to be worked out after excluding allied works.

The following table shows the important works completed in 1969-70.

TABLE II

| S. No. | Name of work | | | | Agency | | Capacity in mt. | | | |
|--------|--------------|----------------------------|----|----|------------|--|-----------------|--|--|--------|
| 1. | F.G.G. | at Ranapratap Bagh Ph. III | .. | .. | C.W.H. | | 10,000 | | | |
| 2. | -do- | Hanumangarh Ph. III | .. | .. | -do- | | 5,000 | | | |
| | | | | | | | | | | 15,000 |
| 3. | F.G.G. | at Ganga Nagar Ph. II | .. | .. | Food Dept. | | 5,000 | | | |
| 4. | -do- | Kota Ph. II | .. | .. | -do- | | 5,000 | | | |
| 5. | -do- | Hanumangarh Ph. II | .. | .. | -do- | | 5,000 | | | |
| 6. | -do- | Indore Ph. II | .. | .. | -do- | | 5,000 | | | |
| 7. | -do- | Ranapratap Bagh Ph. III | .. | .. | -do- | | 10,000 | | | |
| | | | | | | | | | | 30,000 |
| 8. | F.G.G. | at Shaktinagar | .. | .. | F.C.I. | | 5,000 | | | |
| 9. | -do- | Jaipur Ph. III | .. | .. | -do- | | 2,500 | | | |
| 10. | -do- | Dankaur | .. | .. | -do- | | 5,000 | | | |
| | | | | | | | | | | 12,500 |

The following table gives list of works in progress in 1969-70.

TABLE III

| S.No. | Name of work | | | | Agency | | Capacity in mt. |
|-------|--------------|-----------------|----|----|--------|--|-----------------|
| 1. | F.G.G. | at Jaipur | .. | .. | F.C.I. | | 1,000 |
| 2. | F.G.G. | at Vidisa | .. | .. | F.C.I. | | 5,000 |
| 3. | F.G.G. | at Ashoka Nagar | .. | .. | F.C.I. | | 5,000 |

The following table shows the list of works proposed to be taken up in 1970-71.

TABLE IV

| S. No. | Name of Work | Agency | Capacity in mt. |
|--------|---------------------------------|--------|-------------------|
| 1. | F.G.G. at Sawaimadhopur | F.C.I. | 5,000 |
| 2. | „ at Harduaganj | „ | 5,000 |
| 3. | „ at Alwar | „ | 5,000 |
| 4. | „ at Khurja | „ | 5,000 |
| 5. | „ at Etah Ph. V | „ | 5,000 |
| 6. | „ at Vidisha Ph. IV | „ | 5,000 |
| 7. | „ at Newai Ph. IV | „ | 5,000 |
| 8. | „ at Bharatpur Ph. III | „ | 5,000 |
| 9. | „ at Bina | „ | 5,000 |
| 10. | „ at Ashoknagar Ph. IV | „ | 5,000 |
| 11. | „ at Kherli | „ | 5,000 |
| 12. | „ at Etah Ph. IV | „ | 5,000 |
| 13. | „ at Itarsi Ph. IV | „ | 5,000 |
| 14. | „ at Churu Ph. IV | „ | 5,000 |
| | | | <u>70,000 mt.</u> |

Note : In respect of C.W.C. works, data is being collected.

The Schedule at the end shows details of major works and their progress.

2. Construction of Allied Buildings and Works

(Rs. in lakhs)

| Revised Estimate | Budget Estimate |
|------------------|-----------------|
| 1969-70 | 1970-71 |
| Nil | 3.00 |

This activity covers works other than godown construction and relates mainly to construction of institutional and office accommodation. These works are mainly allied works incidental to the main activity of storage construction. The schedule at the end shows the programme of the new work under this activity proposed to be taken up in 1970-71.

3. Maintenance and Repairs

| (Rs. in lakhs) | |
|-----------------------------|----------------------------|
| Revised Estimate 1969-70 | Budget Estimate 1970-71 |
| 3.37 | 1.11 |

The provision under this activity is for the annual repair and maintenance of both godowns and other works. The actual expenditure during 1968-69 was Rs. 3,14,231. Budget estimate 1970-71 is less mainly due to transfer of godowns to the control of the F.C.I.

4. Execution and Administration

| (Rs. in lakhs) | |
|-----------------------------|----------------------------|
| Revised Estimate 1969-70 | Budget Estimate 1970-71 |
| 3.26 | 3.19 |

This activity covers expenditure on the pay and allowance of the E.E., the A.Es./A.E.Es. and the supporting regular staff in the division as well as the sub-divisions engaged on or assisting in the execution of works or house keeping operations. Besides, it includes all other charges of a miscellaneous or contingent nature incurred on office administration.

The following table shows staff position and other relevant data.

TABLE V

| | 1968-69 | 1969-70 | 1970-71 | |
|---|---------|---------|---------|---------------------------|
| (i) No. of officers during the year | | | | |
| E.E. | 1 | 1 | 1 | |
| A.Es./A.E.Es./A.S.W. | 6 | 5 | 7 | (one A.E. leave reserved) |
| (ii) No. of regular staff during the year | | | | |
| Division } Sub-divisions } | 52 | 52 | 52 | |
| (iii) No. of purely work charged employees | 3 | 3 | 3 | |
| (iv) Total workload (Rs. lakhs) | .. | 69.61 | 134.51 | |
| (v) Norm for workload (Rs. lakhs) | .. | 60 | 60 | |
| (vi) Percentage of expenditure on execution and direction to works outlay | N.A. | 4.56% | 2.37% | |

Note : N.A.—Not readily available.

Workload norm is for concentrated works.

This illustrative performance Budget could be improved upon by the Department with more meaningful data.

ANNEXURE I

A Note on Progress Reports, currently in use in Food Storage Division, New Delhi

It was observed that the division is sending numerous returns and reports to higher authorities. A list of returns pertaining to the progress of work, being sent from Sub-division to Division and higher offices and from division to higher offices, is enclosed as Annexure I-A.

The division is dealing only with the construction of foodgrains godowns and ancillary works. It is, therefore, desirable that only reports pertaining to the work dealt by the division are called for by the higher authorities. Despite the fact that the nature of work dealt by the division is fully known to higher offices, the division is required to send nil reports consistently even for works not dealt by it. The idea of eliciting reports is to control the progress of work. The division should not be burdened with unnecessary paper work. It is also expected that a higher office should call for a report or return from lower office only in respect of data which is not already available with it. Data which has either once been supplied earlier or is already available with the office should not be called for again. The fortnightly progress report in respect of crash programme works is submitted by division office to higher offices, but it is seen that the report which is initiated from sub-division office, does not contain any data which is not already available with the division office. The report could have started from division level only without a reference to sub-division.

ANNEXURE I-A

Statement showing Progress Reports currently in use in Food Storage Division, New Delhi

(a) From Sub-Division to Division

1. Weekly progress report for crash works

This is sent by J.E. or A.E. depending upon the location of work to S.S.W. directly and copy is sent to E.E. The report is sent in two parts.

Part I (For circle office only)

(Showing sub-head/item of work, estimated quantity, progress during the week, upto date progress). The report is sent workwise.

Part II—Report is sent compartmentwise

(Shows work, date of commencement, number of compartment, number of bays completed in foundation, R.C.C. column/average height reached above D.P.C., masonry average height reached, plastering, trusses and purlins number assembled and hoisted).

2. Fortnightly progress report for works under crash programme

(Shows name of centre, capacity, date of submission of P.E., date of issue of A/A and E/S, date of handing over site to CPWD, date of approval of layout plan, date of opening of tender, date of acceptance of tender, date of start of work, date of completion as per agreement, progress during the fortnight, progress upto the end of fortnight under report and remarks).

(b) From division to higher offices

1. *Monthly progress report for crash programme works* (Monthly to S.S.W.)

The report is sent centre-wise and is in three statements.

(i) *Statement I*—List of centres where works are in progress. (Showing centre, capacity in mt., date of commencement, date of completion as per agreement, progress during the month under review, upto date progress, date of handing over godowns with capacity and remarks).

(ii) *Statement II*—List of centres where land is available but work not started. (Showing state, centre, capacity in tonnes, date of handing over land by FCI/CWC, and remarks stating reasons for not starting the work and present position).

(iii) *Statement III*—List of centres where land has not been made available for construction. (Showing state, centre, capacity in tonnes, position regarding land, whether staff for these works have been posted and if so when and their category, number and date of posting, remarks).

2. *Monthly return for construction of foodgrain godown (other than crash programme)* (Monthly to SSW)

(Showing centre and capacity, A/A and E/S issued on date and amount, date of start of work, date of completion as per agreement, progress during the month, progress upto the end of the month, likely date of completion, remarks).

3. *Fortnightly progress report for works under crash programmes* (Fortnightly to S.S.W. and copy to C.E., F.C.I. and C.W.C.)

Same as the Report No. 2, submitted by sub-division to division.

4. *Monthly progress report for works costing above Rs. 10 lakhs and not proceeding according to schedule* (Monthly to S.S.W.)

(Shows name of work, stipulated period of completion, target date of completion originally prescribed, reasons for delay in progress, steps taken to accelerate progress, upto date progress in percentage and revised target date).

5. *Weekly brief personal note showing important significant events to S.S.W.* (Currently dealt or are likely to come in future) (Weekly to S.S.W.).6. *Monthly summary for the cabinet* (Monthly to S.S.W.)

Submitted for works pertaining to Ministry of Works, Housing & Supply, Ministry of Defence, Works of other Ministry (F & A) chargeable to their own Demand for Grants. (Shows major works of importance completed during the month, major works of importance taken up during the month, major works of importance sanctioned during the month, important events during the month viz., works awarded, tenders called, tenders recalled, A/A and E/S, works above—which have been authorised by the competent authority to be taken up in anticipation of E/S and list of estimates sanctioned during the month).

7. *List of important works costing more than Rs. 50 lakhs* (Quarterly to S.S.W.)

The return is submitted in two parts.

Part I—Details of Projects completed during the quarter.

(Shows name of project/sub-heads, provision in the estimate administratively approved, agreement amount, gross amount of the extra item sanctioned, net amount of substitutions carried out, and remarks).

Part II—(Shows name of project, amount of P.E., date of A/A and E/S, date of start of project, target date of completion of project, whether progressing according to schedule, reasons for delay and steps taken to accelerate progress.

8. *Monthly expenditure returns* (Monthly to S.S.W., C.E., C.W.C. and F.C.I.)

The Statement shows the position of deposits

9. *Monthly expenditure return under the heads 82.109 C.O. and 124 C.O.*(Monthly to S.S.W. and C.E.)

Part I—Abstract

(Shows name of head, amount of estimate technically sanctioned, budget grant during the year, expenditure upto previous year, expenditure during the month, progressive expenditure during the year, total expenditure upto the month, anticipated for remaining period).

Part II—Workwise

(Shows name of work, remaining columns as per Part I except that expenditure during the month and progressive expenditure are given with break-up for W.O., D.C. and total).

TENTATIVE FORMATS SUGGESTED

ANNEXURE II-A

Progress Report of Works from Sub-division to EE/SSW

PART I

Division: _____ Programme: _____

Sub-division: _____ Activity/Project: _____

Period: _____

| S. No. | Details of work | Main stages of work or milestones | Progress to the end of last week | | Progress during the current week | | Upto date progress to the end of current week | | Remarks |
|--------|-----------------|-----------------------------------|----------------------------------|-----|----------------------------------|-----|---|-----|---------|
| | | | Qty. | % | Qty. | % | Qty. | % | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |

1. Work A

Centre Name
Qty/Units/Capacity
Job. No.
Agreement No. & amount
Date of start
Date of completion as per contract

I. Foundation
(a) E.W.
(b) R.C.C. Footing
(c) Columns
(d) Stone Masonry
II. Super Structure
III. Flooring
IV. Ventilators
V. Doors
VI. Trusses
VII. Roofing

2. Work B

Overall progress

3. Work C

(Bottlenecks, remedial actions, completion and handing over of specific units, etc., to be indicated. If there is any delay in starting the work in cases where land is already available or the position regarding procurement of land and any liability incurred (e.g. staff posted, etc.) in cases where land is not available also to be explained).

PART II

| S. No. | Particulars | Upto-Date Progress | | | | |
|--------|-------------|---|--|---|--|------------------|
| | | Foundation No. of bays completed (Nos.) | R.C.C. Columns Average height reached above D.P.C. (m) | Masonry Average height reached above D.P.C. (m) | Trusses & Purlins No. assembled & hoisted (Nos.) | Plastering (sqm) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |

1. Godown No.

(A) Compartment No. 1

(i) Partition wall between compartment 1 & 2

(ii) etc. etc.

Notes:

1. The above report (to S.S.W. and E.E.) may be sent contractwise i.e. each contract will be a separate serial.
2. Though the form given is applicable for all works, Part II may be sent to E.E./S.S.W. if required, only in respect of crash programme works, under Foodgrain Godown construction.
3. In respect of crash programme works, the reports may be sent weekly as at present. In other cases viz., works of relatively lesser importance, the report be sent monthly, in which case headings in column (4) to (9) of Part I may have to be changed from 'week' to 'month'.
4. Separate progress reports to be sent for each activity as in performance budget (e.g., for grain godowns, ancillary works, etc.)
5. Under each activity plan works should be distinguished from non-plan works.
6. The stages as in col. 3 (Part I) have to be determined by E.E. as per work-breakdown structure in network (PERT/CPM). The stages shown in proforma are only illustrative.
7. The works are to be arranged centrewise.

ANNEXURE II-B

Monthly Progress Report of Works from Division Office to S.S.W./C.E. (For Control Purposes)

(For Important Selected Works)

Circle :
Division :
Progress for period :

Programme :

Activity Project :

A—Financial (for deposit works only)

| S. No. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|--------|-----|-------------------------|----------------|--------------------|-------------|---|--|---|--|--|--|---|--|--|--------------|---------|
| | | Name of work or project | Main sub-heads | As per A.A. & E.S. | Anticipated | Total deposits made available to end of previous year | Total Expendr. to end of previous year | Deposits available to the end of previous year (+ or —) difference of cols. 6 & 7 | Deposits to the end of current month during the year | Total deposits to the end of current month | Total expendr. to end of the current month | Deposits available to end of current month (+ or —) (Difference of cols. 10 and 11) | Total likely expendr. to end of current year | Addl. deposits required to the end of current year | Future needs | Remarks |

A—Financial (for other works)

| S. No. | Name of work or project | Main sub-heads (Major components) | As per A.A. & E.S. | Anticipated | Cost | | Expendr. to end of previous year. | Budget provision during current year | Expendr. to end of current month during the year | Likely expendr. during remaining part of the year | Total likely expendr. during the year | Reasons for variance (cols. 7 and 10) | Total likely expenditure to the end of the year | Commitment for future years | Remarks (Cost over runs (+) or short-falls (-) to date of reporting should be briefly explained here) |
|--------|-------------------------|-----------------------------------|--------------------|-------------|------|-----|-----------------------------------|--------------------------------------|--|---|---------------------------------------|---------------------------------------|---|-----------------------------|--|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | | |

Continued

| S. No. | Details of centre and work | Main Sub-heads of work or stages of work (milestones) | As per A.A. & E.S. | Anticipated | Cost |
|--------|----------------------------|---|---------------------|--------------|--|
| | | | Date of A.A. & E.S. | Date of T.S. | Date of start of work |
| | | | | | Target date of completion |
| | | | | | Total progress to end of last year |
| | | | | | Targetted progress to end of current year |
| | | | | | Targetted progress to end of quarter ending |
| | | | | | Progress to end of current month |
| | | | | | Expected progress to end of quarter ending |
| | | | | | Expected progress to end of year |
| | | | | | Brief reasons for variations (cols. 11 and 15) |
| | | | | | Remedial actions taken/suggested |
| | | | | | Expected date of completion |
| | | | | | Number of units handed over to client department, etc. to end of month |
| | | | | | Remarks |

Continued

i.

(i) Centre

(ii) Name of work

(iii) Capacity in mt.

2.

८५

4.

47

9.

7.

66

•

6

B—Physical (for works not started)

| S. No. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|--------|-----|----------------------------|-----------------|--|------------------------------|--------------------------------------|---------------------------------|------------------------|------------------------------|--------------------------------|-----------------------------|--|
| | | Details of centre and work | Capacity in mt. | Date of submission of Preliminary Estimate | Date of issue of A.A. & E.S. | Date of handing over of site to CPWD | Date of approval to layout plan | Date of call of tender | Date of acceptance of tender | Expected date of start of work | Probable date of completion | Remarks (regarding bottlenecks for delay in starting work and any liabilities incurred, e.g., posting staff, etc.) |

1.

(i) Centre
(ii) Work

2.

3.

C—Critical Areas

(Here the object is to highlight important factors impeding the progress of work or delaying the start of work. Remedial action taken or suggested should be briefly explained. Action called for from S.S.W./C.E. etc. should be indicated).

Notes :

1. The progress report should be activity-wise as adopted for performance budgeting (*i.e.*, Foodgrain godowns, ancillary works, etc.)
2. Plan and non-plan works should be segregated.
3. The stages/milestones will be determined by E.E. depending on the nature of work and as per network (PERT/CPM).
4. For purposes of expenditure control from a purely budgetary angle in terms of Demands, Major Heads and works, the monthly expenditure return as is being sent now may continue.

ANNEXURE II-C

Monthly Progress Reports of Works from Division to S.S.W./C.E. (For Control Purposes)

(In respect of all works other than important selected works)

Circle :

Division :

Progress for Period :

Programme :

Activity/Project :

| S. No. | Name of the work and centre | As per A.A. & E.S. | Cost | Anticipated | Expendr. to end of last year | Physical progress to end of last year % | Anticipated expendr. to end of current year | Anticipated physical progress to end of current year | Expendr. so far to end of current month under report | Progress so far to end of current month under report (%) | Cost overruns (+) or short falls (—) to end of current month | Variance in progress to end of current month (%) | Reasons for cost variance | Reasons for variance in physical progress | Target date of completion | Likely date of completion | Remarks |
|--------|-----------------------------|--------------------|------|-------------|------------------------------|---|---|--|--|--|--|--|---------------------------|---|---------------------------|---------------------------|---------|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | |
| 1. | | | | | | | | | | | | | | | | | |
| 2. | | | | | | | | | | | | | | | | | |
| 3. | | | | | | | | | | | | | | | | | |
| 4. | | | | | | | | | | | | | | | | | |
| 5. | | | | | | | | | | | | | | | | | |

Note : A General narrative should accompany this Report highlighting critical areas or specific problems for action by S.S.W.C.E. Report should be activity-wise. Plan and Non-Plan works should be shown separately. In case of deposit works, excess expenditure over deposit available should be specifically brought to notice.

ANNEXURE II-D

Monthly Progress Report of Works from Division to C.E./S.S.W. (for Information of Clients)

Division :

Programme :

Circle :

Activity/Project :

| S. No. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) |
|--------|-----|-------------------------|--------------------|-------------|--|---|--|--|-------------------|---------------------|--------------|-----------------------|-----------------------------|---------------------------------|-----------------------------------|--|---------|
| | | Name of work and centre | As per A.A. & E.S. | Anticipated | Expendr. so far to end of the month under report | Deposits available to end of month under report | Progress so far to end of the month under report (%) | Balance cost likely for completion of work | Deposits required | Date of A.A. & E.S. | Date of T.S. | Date of start of work | Expected date of completion | Items or Units completed so far | Items or Units handed over so far | Items or Units likely to be ready by the end of the year | Remarks |

1.

2.

3.

4.

5.

Note: 1. In addition to reports as in Annexure II-B, C and D, the Data base in the Division has to send suitable reports to Sr. Architect and S.E (Planning)

2- A general narrative should accompany this Report bringing out important issues having a bearing on the progress of work. Problems of labour, land, machinery, material and changes or revisions sought by the clients should be highlighted.

C

Performance Budget of Civil Aviation Division No. II 1971-72

I. Introductory

Civil Aviation Division No. II, New Delhi under the immediate supervisory charge of S.E. (Central Circle V). The zonal head is the Chief Engineer (North Zone). The Executive Engineer, as the head of the Division, is responsible for the efficient and economical execution of works entrusted to the division.

The division was opened at Delhi in March 1966 with three sub-divisions. Another sub-division was added in December 1970 raising the number to four—three at Palam and one at Nangloi. Each sub-division is under an A.E. with 2 to 5 sections. Besides the E.E. and 4 A.Es., the division has a total strength of 15 Junior Engineers and 28 ministerial staff (including sub-division and sections).

The main function of the division is the construction of runways, taxiways, terminal facilities and other works at Palam Airport. The workload of the division during 1968-69, 1969-70 and 1970-71 was of the order of Rs. 39.92, 49.71 and 59.12 lakhs respectively against the prescribed norm of Rs. 60 lakhs. The anticipated workload in 1971-72 is expected to be Rs. 58 lakhs.

The financial requirements of the Division for 1971-72 in terms of its various programmes and activities are as follows:

II. Financial Requirements

(Rupees in lakhs)

| Revised Estimates 1970-71 | Budget Estimates 1971-72 |
|---------------------------------|--------------------------------|
|---------------------------------|--------------------------------|

A. Programme/Activity Classification

| | | | | |
|--|----|----|------|-------|
| 1. Runways and Taxiways | | | | |
| (a) Extensions and Improvements to Runways | | | | |
| (i) New Constructions | .. | .. | — | — |
| (ii) Improvements and Extensions | .. | .. | 2.25 | 10.20 |
| (b) Development of Taxiways | | | | |
| (i) New Construction | .. | .. | 0.10 | 10.00 |
| (ii) Improvements | .. | .. | 8.15 | 0.20 |
| 2. Terminal Facilities | | | | |
| (a) Domestic | .. | .. | 9.02 | 6.55 |
| (b) International | .. | .. | 8.98 | 11.55 |
| (c) Common Facilities | .. | .. | 0.40 | — |

| | | | Revised Estimates 1970-71 | Budget Estimates 1971-72 |
|---|----|----|---------------------------------|--------------------------------|
| <i>3. Apron Facilities</i> | | | | |
| (a) New Construction | .. | .. | — | 1.00 |
| (b) Improvements | .. | .. | 0.07 | — |
| <i>4. Hangers and Night Parking</i> | | | | |
| (a) Hangers | .. | .. | 0.37 | — |
| (b) Open Area | .. | .. | 25.55 | 0.30 |
| <i>5. Operational Facilities</i> | | | | |
| (a) Air Traffic Control | .. | .. | — | — |
| (b) Radar | .. | .. | 1.50 | 2.90 |
| <i>6. Acquisition of Land</i> | | | | |
| (i) Acquisition | .. | .. | 1.05 | 10.30 |
| (ii) Development of New Land | .. | .. | — | 1.00 |
| <i>7. Roads and other ancillary services</i> | | | | |
| (a) Roads | .. | .. | — | 2.00 |
| (b) Other Works | .. | .. | 1.68 | 2.00 |
| 8. Execution and Supervision | .. | .. | 2.90 | 2.80 |
| Total A | .. | .. | 62.02 | 60.80 |
| <i>B. Object-wise classification</i> | | | | |
| 1. Establishment Charges | .. | .. | 1.44 | 1.50 |
| 2. Travelling Expenses | .. | .. | 0.09 | 0.10 |
| 3. Office Contingencies | .. | .. | 0.20 | 0.20 |
| 4. Other Charges | .. | .. | 1.17 | 1.00 |
| 5. Tools & Equipment | .. | .. | — | — |
| 6. Works Outlay | .. | .. | 59.12 | 58.00 |
| Total B | .. | .. | 62.02 | 60.80 |
| <i>C. Sources of Financing</i> | | | | |
| 1. Demand No. (Major head 112 C.O. on Aviation). | .. | .. | 58.58 | 53.00 |
| 2. Demand No. (Major head 104 D.C.O.) | .. | .. | — | 5.00 |
| 3. Demand No. (Major head 56 Aviation) | .. | .. | 0.54 | — |
| 4. Demand No. (Major head 50 Public Works) | .. | .. | 2.90 | 2.80 |
| Total C | .. | .. | 62.02 | 60.80 |

Notes : 1. Plan and Non-Plan provisions should be distinguished in the above section.

2. Actuals 1969-70 and B.E. 1970-71 figures should also be given.

III. Explanation of Financial Requirments

1. Runways and Taxiways

(a) Extensions and Improvements to Runways

(i) New Construction

| (Rs. in lakhs) | |
|---------------------------------|--------------------------------|
| Revised Estimates 1970-71 | Budget Estimates 1971-72 |
| Nil | Nil |

There is no new construction programme contemplated either in the current year or next year for extensions and improvements to runways at Palam. The work of construction of Turning Pad 250' × 250' size at extended 28 end of runway at C.A. Palam, which was started in December 1969, was completed in May 1970.

(ii) Improvements and Extensions

| (Rs. in lakhs) | |
|---------------------------------|--------------------------------|
| Revised Estimates 1970-71 | Budget Estimates 1971-72 |
| 2.25 | 10.20 |

The provision in the current year is towards extension of 10/28 runway from 10500' to 12500' length at C.A. Palam. The work which was started in October 1968 was completed in June 1970. It is expected that the work of extension of runway by 1000' at 28 end with an overrun, for which a provision of Rs. 10 lakhs has been proposed in 1971-72, would be taken up next year as soon as necessary administrative approval is received. The remaining provision of Rs. 0.20 lakhs is for finalisation of works already completed.

(b) Development of Taxiways

(i) New Construction

| (Rs. in lakhs) | |
|---------------------------------|--------------------------------|
| Revised Estimates 1970-71 | Budget Estimates 1971-72 |
| 0.10 | 10.00 |

The provision in the current year is for the completion of the work of construction of link taxi connecting 10/28 runway to 09/27 runway at Palam. The work was started in March 1969 and completed in January 1970. It is expected that the work of construction of parallel link taxi associated with its holding apron would be taken up in 1971-72 on receipt of necessary administrative approval. A provision of Rs. 10 lakhs has been proposed for this work in 1971-72.

(ii) Improvements

| (Rs. in lakhs) | |
|---------------------------------|--------------------------------|
| Revised Estimates 1970-71 | Budget Estimates 1971-72 |
| 8.15 | 0.20 |

The work of strengthening of taxi track connecting 28 end and 27 end of 10/28 and 09/27 runway and widening of shoulders at Palam was started in April 1970 and completed in October 1970. This taxiway will provide access to Boeings 747 for coming over to the night parking apron and, therefore, its strength should be at least the same as that of night parking apron, viz., LCN 60. The original budget provision in 1970-71 of Rs. 5 lakhs was revised to Rs. 8.15 lakhs for completing the work. A provision of Rs. 20,000 only is proposed for 1971-72 to make balance payments.

The schedule at the end shows the details of major works under Runways and Taxiways programme together with their financial and physical progress.

2. Terminal Facilities

(a) Domestic

| (Rs. in lakhs) | |
|----------------------|---------------------|
| Revised Estimates | Budget Estimates |
| 1970-71 | 1971-72 |
| 9.02 | 6.55 |

In 1970-71, the provision was made for the following 3 works as per details below:

- | | | |
|---|----------------|---|
| A. Improvements & Extensions to Terminal Building at C.A. Palam (Balance payments) .. | Rs. 0.25 lakh | work completed on 31-1-1969 |
| B. Interim Modifications to the existing Terminal Building at Delhi Airport | Rs. 8.50 lakhs | work expected to be completed by March 1971 |
| C. Facade for the terminal towards Air field side and provision of additional amenities to the existing terminal buildings (Balance payments) | Rs. 0.05 lakh | work completed on 31-1-1969 |

In addition, a sum of Rs. 0.22 lakh was provided for miscellaneous works costing less than Rs. 5 lakhs.

During 1971-72, a sum of Rs. 2 lakhs has been proposed to meet balance payments in respect of work of interim modification to the existing terminal building at Delhi Airport which is likely to be completed by March 1971. A sum of Rs. 4.50 lakh has also been proposed for anticipated major works costing less than Rs. 5 lakhs each and Rs. 5,000 for finalisation of accounts of completed works.

(b) International

| (Rs. in lakhs) | |
|----------------------|---------------------|
| Revised Estimates | Budget Estimates |
| 1970-71 | 1971-72 |
| 8.98 | 11.55 |

The current year's provision is for the International portion of works A and B mentioned under (a) Domestic above and for anticipated works costing less than Rs. 5 lakhs. During 1971-72, Rs. 2 lakhs has been proposed for the International portion of work of Interim modifications to the existing terminal building at Delhi Airport, Rs. 5,000 for finalisation of bill of the work improvements and extensions to terminal building, Rs. 4.50 lakhs for anticipated major

works costing less than Rs. 5 lakhs and Rs. 5 lakhs for the construction of a receptorium at Palam for which A.A. is awaited.

(c) Common Facilities

| (Rs. in lakhs) | |
|---------------------------------|--------------------------------|
| Revised Estimates 1970-71 | Budget Estimates 1971-72 |
| 0.40 | — |

The budget provision in 1970-71 was for purchase of Sofa Chairs (150 nos.), for domestic and international arrival halls.

The schedule at the end shows the details of major works under Terminal Facilities Programme together with their financial and physical progress.

3. Apron Facilities

(a) New Construction

| (Rs. in lakhs) | |
|---------------------------------|--------------------------------|
| Revised Estimates 1970-71 | Budget Estimates 1971-72 |
| Nil | 1.00 |

The work of construction of New Apron at new Terminal site is proposed to be started next year on receipt of necessary administrative approval. A sum of Rs. 1 lakh has been proposed towards this.

(b) Improvements

| (Rs. in lakhs) | |
|---------------------------------|--------------------------------|
| Revised Estimates 1970-71 | Budget Estimates 1971-72 |
| 0.7 | Nil |

The budget provision in 1970-71 was for balance payments in respect of the following works:

- | | | |
|---------------------------------------|-------|-----------------------|
| A. Extension of jet apron at CA Palam | | Completed on 9-5-1969 |
| B. Taxi guidance systems and parking | | Completed on 4-1-1969 |

Details of major works with their financial and physical progress are given in the schedule at the end.

4. Hangers and Night Parking

(a) Hangers

| (Rs. in lakhs) | |
|---------------------------------|--------------------------------|
| Revised Estimates 1970-71 | Budget Estimates 1971-72 |
| 0.37 | — |

The provision in 1970-71 is for dismantling of B.O.A.C. hanger and re-erecting it at another site.

(b) Open Area

| (Rs. in lakhs) | |
|---------------------------------|--------------------------------|
| Revised Estimates 1970-71 | Budget Estimates 1971-72 |
| 25.55 | 0.30 |

Open night parking apron measuring 919' x 400' is constructed just behind and connected

with three lines to the taxiway joining 27 and 28 ends of runways 09/27 and 10/28 respectively. This apron would permit parking of 3 large aircrafts. The strength of the apron is made to L.C.N. 60 as it will not be required to be used frequently and regularly to unlimited extent by large capacity aircraft.

This overnight parking apron shall be used as composite apron for (a) overnight parking of aircraft, (b) day and night short term parking of aircraft when the existing apron gets saturated during peak hours, (c) parking of Boeing 747 aircraft if such a situation arises when it becomes necessary to handle Boeing 747 earlier than the construction of the new terminal complex on the south side of main runway 10/28.

The provision in the year 1970-71 is for construction of night parking apron—main apron (Rs. 24.10 lakhs) and for construction of ramp equipment area (Rs. 1.45 lakhs). The provision of Rs. 30,000 in 1971-72 is for finalisation of bills.

Details of the above works with their progress, are given in the schedule at the end.

5. Operational Facilities

(b) Radar

| (Rs. in Lakhs) | |
|----------------------|---------------------|
| Revised Estimates | Budget Estimates |
| 1970-71 | 1971-72 |
| 1.50 | 2.90 |

The provision is for the installation of Air-route Surveillance Radar at Delhi Airport. Details of the work are given in the schedule at the end.

6. Acquisition of Land

(i) Acquisition

| (Rs. in Lakhs) | |
|----------------------|---------------------|
| Revised Estimates | Budget Estimates |
| 1970-71 | 1971-72 |
| 1.05 | 10.30 |

The provision in the Budget is towards enhanced compensation for the land acquired at Delhi Airport (Rs. 1.05 lakh in current year and 0.30 lakh in 1971-72). A sum of Rs. 10 lakhs is provided in 1971-72 for acquisition of land.

(ii) Development of new land

| (Rs. in lakhs) | |
|----------------------|---------------------|
| Revised Estimates | Budget Estimates |
| 1970-71 | 1971-72 |
| — | 1.00 |

A sum of Rs. 1 lakh is proposed for 1971-72 towards development of air terminal area at airport. A.A. is awaited.

7. Roads and other Ancillary Services

(a) Roads

| (Rs. in lakhs) | |
|----------------------|---------------------|
| Revised Estimates | Budget Estimates |
| 1970-71 | 1971-72 |
| — | 2.00 |

The works for which provision is proposed in 1971-72 are :

- (i) Construction of diversion of road from Cantonment and construction of internal road (Rs. 1 lakh), and

- (ii) Construction of approach road and parking area to the International Arrival Hall at Delhi Airport (Rs. 1 lakh).

(b) Other works

| (Rs. in lakhs) | |
|----------------------|---------------------|
| Revised Estimates | Budget Estimates |
| 1970-71 | 1971-72 |
| 1.68 | 2.00 |

Details of works for which provision is made are given in the schedule at the end.

8. *Execution and Supervision*

| (Rs. in lakhs) | |
|----------------------|---------------------|
| Revised Estimates | Budget Estimates |
| 1970-71 | 1971-72 |
| 2.90 | 2.80 |

Under this head the pay and allowances of the E.E., the A.Es. and J.Es. who are in charge of execution and supervision of works in the Division and also the staff in the Division and Sub-Divisions is included and also the house-keeping expenses. The following table shows the relevant data under this activity :

| | | | | 1969-70 | 1970-71 | 1971-72 |
|------------------------|----|----|----|---------|---------|---------|
| 1. Officers : | | | | | | |
| E.E. | .. | .. | .. | 1 | 1 | 1 |
| A.E. | .. | .. | .. | 3 | 4 | 4 |
| 2. Other Staff | .. | .. | .. | 43 | 43 | 43 |
| 3. Workload (Rs. lakh) | .. | .. | .. | 49.71 | 59.12 | 58 |
| 4. Norm for workload | .. | .. | .. | 60.00 | 60.00 | 60.00 |

Note: The contents of this illustrative performance budget need further improvement. The required data was not readily available.

ANNEXURE I

Statement Showing Progress Reports Currently in Use in Civil Aviation Division No. II

1. *Progress Reports from Sub-divisions to Division*

(a) Monthly progress reports, prepared separately for sanctioned major works in progress, sanctioned major works for which A.A. and E.S. has been received but work has not started, unsanctioned major works and deposit contribution works, showing name of work, estimated cost of work, number and date of A.A. and E.S., amount of technical sanction, date of approval of N.I.T., date of commencement of work, physical progress and expenditure during the current financial year. Under expenditure head, expenditure up to the end of previous month, up-to-date expenditure and probable expenditure during the remaining part of the current year are given. Under physical progress, percentage up to the end of previous month, percentage up-to-date, target date of completion as per contract, whether work is proceeding according to schedule or not, reasons for delay in completion and remedial action taken or proposed to be taken to speed up the work are given.

However, there is no standard proforma prescribed for this purpose.

(b) Percentage monthly progress report showing name of work, number and date of approval, expenditure sanction, date of award, date of commencement, date of completion as per agreement and as revised, progress during the month, total percentage progress, actual date of completion and remarks.

2. *Reports from Division to Higher Offices*

(a) Monthly progress report of major works as mentioned under 1(a) above and containing the same details. In addition, the report from the Division shows the position regarding equipment also—whether any equipment is to be installed; if so, cost of equipment lying in stock for installation; date of purchase of equipment; date of installation of equipment; and expenditure to the end of the previous year.

The reports from the E.E. are sent to the E-in-C, C.E., S.E. and D.G.C.A. Reports are sent in respect of sanctioned works costing more than Rs. 5 lakhs in progress and also for sanctioned works costing less than Rs. 5 lakhs in progress.

(b) Monthly summary for Cabinet showing important works completed during the month, important works taken up during the month, important works sanctioned during the month and other important events during the month. The estimated cost of the works is also given.

This report is sent by the E.E. to the S.E.

(c) Quarterly report showing construction of residential buildings in the general pool during the plan period—nil reports are being sent, as this is not relevant for the Division.

(d) Quarterly progress reports regarding acquisition of land for general pool accommodation—nil reports are being sent as this is not relevant for the Division.

(e) Monthly progress report of expenditure under Major Head 52—Capital Outlay within Revenue Account—this shows sub-headwise expenditure to the end of the month. The sub-heads follow the Grant. Plan and non-Plan expenditure is shown separately.

(f) Monthly progress report of the expenditure under the Major Head 56 Aviation—G works—shows name of work, grant sanctioned, proportionate grant to the end of the month under report during the year, actual expenditure during the month, progressive total to the end of the month, variation between proportionate grant and actual expenditure to-date, brief explanation for variation, actual date of completion, amount of extra items paid and amount of substituted items.

(g) Monthly expenditure return under Heads 103 and 104 Capital Outlay—nil reports are being sent.

(h) Expenditure card—a card is maintained showing name of Division, name of Executive Engineer, total Demand allotment under major, minor and maintenance works, total booked expenditure, progressive total, etc.

(i) Departmental expenditure statements under the Major Head 50 P.W.C. (Establishment)—sent monthly, showing item, expenditure up to previous month, expenditure during the month and expenditure up to the end of month.

(j) Quarterly Return on Utilisation of Budget Grant—this shows progress of expenditure on Plan Schemes, physical progress of schemes, etc. for works costing Rs. 1 lakh or above. Details of name of work, estimated amount with D.C., sanction number and date, date of commencement of work, date of completion of work as per contract, target date of completion of work, amount of expenditure up to previous year, amount of expenditure targetted to be incurred during the quarter of the year, actual expenditure incurred, difference in expenditure incurred, remarks regarding shortfalls or increase, etc.

This is sent by the E.E. to S.E./C.E. quarterly.

(k) Returns showing State-wise expenditure on works at Civil Aerodromes in India.

(l) Expenditure on International and Domestic airports for (Lok Sabha purposes.)

(m) Statements showing list of works executed during the last three years costing more than Rs. 20 lakhs—this shows name of work, name of contractor, amount of the project, period for the completion as stipulated in the contract, actual time taken for the completion of the project, reasons for delay, etc.

ANNEXURE II

Progress Report Formats

Please see Annexures II-A to II-D in Section A of this Part, wherein tentative formats for reporting progress in respect of Construction Division No. IV have been attempted, pending refinements. These hold good in the case of the Civil Aviation Division also. As such, they are not repeated here.

D

Formats for Reporting Progress and Review

Physical and financial progress reporting on a brief but effective way has been in vogue in Agra Central Circle for over a year and this has been found useful. The financial targets are fixed and reviewed through a "workload review" chart and physical targets are fixed and reviewed through milestone charts.

The workload review for one of the Divisions as actually filled up for 1970-71 is enclosed in Annexure 1. In installing this information system, the following steps are involved :

- (a) An ABC analysis is conducted for projects in a Division. In the present case, it was found that works in 3 projects covered 89 per cent of the total work outlay and these projects were taken for detailed programming and control. Other works were grouped together. Works which are important from any aspect other than financial outlay should also be included in the list for detailed review.
- (b) For each work, target dates are fixed for receiving administrative approval, according to technical sanction, starting and completing the work. While fixing these targets, factors like priority attached to a project by a client department, work in hand with S.W. Organisation, likelihood of satisfactory receipt of tenders on first call, are kept in view. The target dates are shown by inverted triangles suffixed 1, 2, 3 and 4. These milestones are shown against a time calendar. The period between milestones 3 and 4 is shown by a bar and this represents the anticipated expenditure on the project during the year. The "historical" information is also incorporated in the chart.
- (c) Actual dates of events like receipt of administrative approval, accord of technical sanction for new works and expenditure incurred during the month for works in progress is reported by the E.E. in a simple form, given in Annexure 2. There is no repetition of historical data and the last column of the report gives steps being taken by the E.E. or action requested of higher authority to make up for lost time.
- (d) On receipt of report from the E.E., the chart is filled up by a Junior Engineer.

This chart gives a continuous record of progress of works. By showing expenditure for different months by different colours, a historical break-up of the progress is also available at a glance. The chart can be maintained even by a non-technical clerk with a little training. It has the following virtues :

- (a) As information submitted to the E.E., is simple, straight-forward and does not involve

much drafting or typing, it can be sent timely and accurately. The figures of expenditure should be to nearest thousand and need not await completion of monthly accounts. It can be worked out on basis of bills paid and materials issued.

- (b) The reporting is brief and much more useful than the forms in use. There is more scope for the E.E. to add his analysis of current problems and suggesting solutions.
- (c) Predictive and forward looking quality aids to decision making. Variations between budget and actual expenditure occur mostly in cases where start of work is delayed for one reason or the other. By introducing milestones for administrative approval and technical sanction, the shortfalls can be anticipated 4 to 6 months in advance. Decision to transfer works, closure or opening of a unit if the sanctions come earlier than anticipated, can thus be taken. The programme of preparation of detailed drawings by Architect and detailed estimates by S.W. can be rescheduled.
- (d) As mentioned earlier, the chart can be kept upto date by a Jr. Engineer or even a Clerk. A case can be put up for review to S.E./C.E. only when an event has fallen behind schedule by certain period (say one month) or the expenditure has fallen short by more than a certain percentage. Other cases need not be brought to their notice. The Chart is, therefore, suitable for "management by exception", especially when the number of projects to be watched is large.
- (e) Uniformity and effectiveness. The form is simple and more effective than the existing ones.

The report also avoids:

- (a) Routine reporting.
- (b) Too many details. The number of works is reduced by ABC analysis. Only the essential aspects are reported upon.
- (c) Concentrating on recording what happened and repetition of information of historical nature.
- (d) Repeating information already available in higher offices as administrative approval, expenditure sanction, technical sanction, etc.

For watching physical progress of works, milestone charts are used. One chart for Residential Quarters at Ajmer is shown at Annexure 3. It would be noticed that the work has been divided into blocks depending on the centring and shuttering and other resources available with the contractor rather than the type of quarters. Entire work has been broken up into 21 events for reporting. The extent of detail would however depend on the individual work. Although the date of completion was May 1971, the programme was prepared for completing the work by January 1971. The contractor thought he could complete this work earlier and it also gave the Department some float against unforeseen slippages.

The milestone chart is a simplification of the CPM/PERT programming as given in Annexures C1 and C2 of Part III of the Report. Whereas CPM/PERT chart requires training of staff and expertise in programming, the milestone charts can be drawn easily by site staff. They are experienced enough to establish the logic of the network.

The two charts discussed above would give adequate control at levels of C.E. and S.E. for all purposes.

ANNEXURE 1

Work Load Review Gwalior Central Division

1970-71

| S No | PROJECT | A/A IN LACS | ANTICIPATED COST (IN LACS) | EXPENDITURE MARCH TO | PROGRAMME | DATE START | DATE COMPLETION | EXPENDITURE TO-71 | REMARKS |
|-------------------------------------|--|------------------|----------------------------|----------------------|--|------------|-----------------|-------------------|----------------------------|
| | | | TOTAL | AMOUNT % | APR 70 MAY 70 JUNE 70 JULY 70 AUG 70 SEPT 70 OCT 70 NOV 70 DEC 70 JAN 71 FEB 71 MAR 71 | | | TOTAL | |
| 1 | OFFICE BLDG FOR AGMFP GWALIOR a) FIVE STOREYED STRUCTURE WITH CANTEN-VISITORS SUIT ETC b) SIXTH STORY | 58-74 | 49-74 | 30-12 60 | 4 | 2/68 | | 19 62 | 19 62 |
| 2 | STAFF QUARTERS FOR AGMFP GWALIOR | | 10 00 | | 5 | " | | 6 10 | 6 10 |
| a) 152 TYPE 2 QRTS. | | 8-82 | 15 00 | 10 94 73 | 4 | " | | 5 06 | |
| b) 72 TYPE 3 & 20 TYPE 4 QRTS | | 32-18 | 14-91 | 8-28 55 | 4 | 5/68 | | 6 65 | 13-34 |
| c) SERVICES OVERHEAD TANK SUMP ETC. | | | 5-31 | | 4 | 8/68 | | 1 65 | |
| 3 | B.S.F WORKS AT TEARMPUR a) QRTS IN PHASE I, 16 TYPE 2, 8 TYPE 3, 4 TYPE 4 b) QRTS IN PHASE II, 20 TYPE 2, 4 TYPE 4, 2 TYPE 5. c) BARRACKS, MESS & COOK HOUSE LAY BLOCK d) EXPLOSIVE STORE & MAGAZINES e) AMMUNITION SHED f) TACTICAL CENTRE g) 20 SINGLE OFFICERS HOSTEL h) 20 TYPE 2 QRTS. i) 60 TYPE 1 QRTS. j) 2 TYPE 6 QRTS | 15-20 + 11-86 | 4-51 | 0-55 | 4 | 2/70 | | 5 67 | |
| | | | 3-72 | 1-72 46 | 4 | 7/69 | | 2 00 | |
| | | | 6-61 | 5-36 81 | 4 | 6/69 | | 1 25 | |
| | | | 0-87 | 0-37 43 | 4 | 3/69 | | 0-50 | DEMAND REVISED TO (JAN-71) |
| | | | 1-27 | 0-77 49 | 3 | 2/70 | 9/71 | 0-50 | 0 50 |
| | | 4-21 | 4 60 | | 3 | 8/71 | | 2 30 | 0-50 |
| | | 1-50 | 2 00 | | 3 | 6/71 | | 2 00 | 0-50 |
| | | 9-06 | 10 00 | | 3 | 11/71 | | 2 30 | 1 50 |
| | | 1-58 | 1 58 | | 3 | 6/71 | | 0 90 | 0 25 |
| 4 | OTHER CONSTRUCTIONS | | 8-54 | 8 34 | 3 | | | 8 54 | |
| 5 | MINOR WORKS & MAINTENANCE EQUIPMENT ACTUALS 1 49 > 3 = 47 | | 4-47 | 4 47 | 3 | | | 4 47 | |
| | | TOTAL | 143-14 | | | | | 69 69 | |

LEGEND
 RECEIPT OF E/S
 TECHNICAL SANCTION
 START OF WORK
 COMPLETION OF WORK
 TARGET
 ACTUAL

ANNEXURE 2

Report For Workload Review

Division: GWALIOR

Month :

| S. No. | Event/work | Milestones dates | | | Expenditure | | | Remarks |
|--------|--|------------------|-------------|------|-------------|--------|-------------------|---|
| | | Schedule | Actual | Gain | Schedule | Actual | Excess Short-fall | |
| | | | Anticipated | Loss | | | | |
| 1. | Give ref. no. to identify work/milestone. Thus 2(c)-3 means start of overhead tank and sump, AGMP quarters | | | | | | | (i) Give steps being taken to make up loss/short fall (ii) Mention any action required of S.E./C.E |
| 2. | | | | | | | | |
| 3. | | | | | | | | |
| 4. | | | | | | | | |
| 5. | | | | | | | | |
| 6. | | | | | | | | |
| 7. | | | | | | | | |
| 8. | | | | | | | | |

ANNEXURE 3

Milestone Chart CPWD Staff Quarters, Aimer

Target Date of Event: 
Actual Date of Event: 

Completed : May, 1971

Cost : 15.76 lakhs
Start : July, 1970

| SERIAL NUMBER | DESCRIPTION | AUG-70 | SEPT-70 | OCT-70 | NOV-70 | DEC-70 | JAN-71 | FEB-71 | MARCH-71 | APRIL-71 | MAY-71 |
|---------------|--|-------------|-------------|--------|--------------------------------|--|--|--------|----------|----------|--------|
| 1 | BLOCK NO 5 B NOS TYPE II | 2 1 1 | 2 1 1 | 6 7 | 8 9 10 11 12 13 | 14 15 16 17 18 19 20 21 | 22 23 24 25 26 27 28 29 30 31 | | | | |
| 2 | BLOCK NO 6 B NOS TYPE II | 1 1 1 | 2 1 1 | 6 7 | 8 9 10 11 12 13 | 14 15 16 17 18 19 20 21 | 22 23 24 25 26 27 28 29 30 31 | | | | |
| 3 | BLOCK NO 1 B NOS TYPE IV | 1 1 1 | 2 1 1 | 6 7 | 8 9 10 11 12 13 | 14 15 16 17 18 19 20 21 | 22 23 24 25 26 27 28 29 30 31 | | | | |
| 4 | BLOCK NO 7 B NOS TYPE I | 1 1 1 | 2 1 1 | 6 7 | 8 9 10 11 12 13 | 14 15 16 17 18 19 20 21 | 22 23 24 25 26 27 28 29 30 31 | | | | |
| 5 | BLOCK NO 2 3B NOS TYPE III | 1 1 1 | 2 1 1 | 6 7 | 8 9 10 11 12 13 | 14 15 16 17 18 19 20 21 | 22 23 24 25 26 27 28 29 30 31 | | | | |
| 6 | BLOCK NO IV B NOS TYPE II | 1 1 1 | 2 1 1 | 6 7 | 8 9 10 11 12 13 | 14 15 16 17 18 19 20 21 | 22 23 24 25 26 27 28 29 30 31 | | | | |
| 7 | APPROVAL OF SAMPLES & PROCUREMENT OF MATERIAL | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 8 | INTERNAL ELECTRIFICATION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 9 | ROADS AND SW DRAINS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 10 | WATER SUPPLY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | SEWERAGE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 12 | EXTERNAL ELECTRIFICATION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

PART III

Introduction

In the present times when technology is taking big leaps, the sheer size and complexity of projects as well as the number of participants involved make it imperative that management should go beyond the conventional methods of project planning and control and accept new and more dynamic tools of planning, scheduling and control. Experience in advanced countries has shown that in many project activities involving construction, maintenance and other engineering works, CPM/PERT* technique have proved to be very effective in controlling cost and time. Both CPM/PERT are based on Network theory and are now more popularly known as Network techniques. These constitute graphic representation of a project plan by a schematic diagram or network that depicts the various component parts and activities of the project, arranged systematically in a logical sequence of their occurrence showing clearly their inter-dependencies and relationships. The logical analysis and the manipulation of the Network are utilised in determining an optimum programme of operations in a work plan. Networks are particularly suited to construction works and in situations where there is inter-dependency of the constituents and more than one agency is responsible for the completion of the project, calling for effective coordination of efforts. Besides providing a rational basis for scheduling and cost control, Networks provide a method of ready evaluation and comparison of alternative work programmes, construction methods, types of equipment, etc. The 'Critical Path' in a Network clearly isolates the operations that are most vital to the timely completion of the project and those areas which need priority of attention by project management. During the execution of works, this provides the project manager with precise information on the effects of each variation or delay on the schedule plan.

Besides providing a realistic basis for determining the period of completion of a work, Network provides a basis for logical thinking and binds the entire organisation into one whole for fulfilling the overall objectives of the organisation, as it establishes a clear relationship of the parts to the whole. Consequently, various officers who are responsible for the completion of the project know clearly the importance and relationship of their part of work with that of others as well as with the overall completion of the project and also the effect of any variation or delay in their works on the performance of others.

In projects where time and cost of various operations can be estimated to a reasonable degree of accuracy, CPM would prove to be advantageous. Although, in any construction project, there would be uncertainties, cost and time for each operation can be reasonably

*Critical Path Method/Programme Evaluation and Review Technique.

estimated and all operations may then be reviewed with the help of CPM in accordance with the conditions and hazards that are encountered at site.

The PERT System involves 'probability approach' to the time variable in the planning and control of projects and is suited to works where major uncertainties exist. Initially, it did not consider the cost as a variable, but now more sophistication has been achieved by introducing the cost variable (also on probability basis) and the system is now known as PERT/Cost.

Any construction project can be divided into a number of operations, each of which may be performed by different combinations of construction methods, equipment, labour strength and working hours. The major factors governing the selection of a programme of work plan involving alternative combinations of operations may be cost, time or both. The time-cost problem could be resolved in many ways. If time were not a consideration, each operation could be performed in a manner that gives the lowest direct cost. If on the other hand, cost were of no importance, each process could be speeded up to be completed in the least time. All costs vary with time; direct costs tend to decrease if more time is available for an operation, but indirect and overhead costs will increase with time. CPM/PERT provides a systematic procedure for correlating the effects of cost and time to produce the optimum solution for construction problems.

Good deal of literature is now available in the country on the basic concepts of Network technique; viz., CPM/PERT. In fact, CPWD itself had organised a Seminar on the subject recently. As such, the basic principles and mechanics of the technique are not dealt with in this Part. A list indicating Bibliography on the subject is attached (Annexure A).

Role of Network Technique in Budgeting and Reporting

The technique of performance budgeting envisages the awakening of performance consciousness. If performance budgeting is to be utilised as a control tool in the hands of management, it needs, among other things, some rational basis/methods to control and assess the actual physical progress of works and projects. A budget is designed to be an operational document that will provide the framework for implementation and control of the various activities. However, the actual progress and control during the work implementation in relation to what was planned and reflected in the budget, have to be watched and exercised through appropriate devices. In this connection, network technique has a major role to play. Day-to-day control and decision-making on problems cropping up during construction can be accomplished by this technique. Besides, budget-making itself will be more realistic with a knowledge of the quantity and cost of operations to be completed in a particular period, made possible by the use of Networks.

Performance budget is a plan of action in financial and physical terms phased over a specific period of time. At present, the assessment of anticipated expenditure for a project, during the year for purposes of budgeting is done mainly on the basis of experience of individual officers and historical data. While proposing provisions for works outlay, the likely expenditure on new works to be taken up or works in progress during the period is assessed roughly without any clear idea as to how much will be done. These figures also form the basis for workload of divisions and other higher formations of the CPWD. The budgetary control on funds is exercised by reviewing and comparing the difference between the proportionate budgeted provision for the period and the actual expenditure. For working out the anticipated workload during the remaining period of the year, a rough estimate of work to be done is made and this is projected. This obviously is not a fool-proof method of assessing the workload or exercising budgetary control. It is not unusual to notice wide variations between the actuals and budget provisions, resulting either in heavy shortfalls or excesses. This is not surprising, as neither the formulation of the budget nor the subsequent reviews were based on a correct and realistic data of actual work to be done, assessed with reference to a realistic work plan. Works are not generally planned adequately and followed up effectively. Instances are many where works are delayed resulting in an overall increase in cost. The staff engaged on the work is retained for longer periods resulting in an increase in the overheads. Also, there are many occasions when there is a time gap between assessing workload and determining the staff thereby upsetting the schedule. Situations of this kind can be avoided if, instead of relying on individual discretion based on experience in anticipating budgetary and workload demands, proper financial and work plans are drawn up on certain logical and realistic considerations which are inherent in the

use of network analysis. Networks use rational planning and logic, and in doing so, no doubt, it draws on individual skill and experience as well.

Cost planning under performance budgeting is greatly facilitated by the use of Network technique. The sequence of events and activities and their occurrence at specific times are depicted in a Network, from which costs of works are estimated for a given period (say a year). In fact, one of the advantages of the network based management control system is that it provides a realistic basis for allocating resources. Since all constraints are displayed in the Network, it gives a complete picture of the programme thereby enabling a careful consideration of all constraints and needs before allocating resources. This avoids under-budgeting or over-budgeting.

For building up a performance budget from a Network, the complete work is divided into physically identifiable units constituting the Work Breakdown Structure (W.B.S.). The items appearing at the lowest level of the Work Breakdown structure are further divided into Work Packages. At the lowest level of such a sub-division, these are the basic units of the PERT/COST system for cost planning and control. Work Package represents the unit of work required to complete a specific job such as design, drawing or a service which is within the responsibility of one operating unit in an organisation. Their number depends naturally on the magnitude of the work, its complexity and the amount of details needed by the manager to plan and control his work. These also form the cost centres and detailed accounting heads for booking the expenditure. Work package normally is a functional breakdown of the lowest level items of the W.B.S. *e.g.*, fabrication, assembly, testing etc. But they may also be designed to enable management segregate cost by organisation, skills, end-items or any other criterion.

In the case of a contract work, the work packages may be identical or nearly identical to the bid items in the contract. It may be represented on the Network by a single activity or by a group of activities. The W.B.S. is developed by listing major components of the work, proceeding downwards from the definition of the work or project through successive levels to the lowest level of details required for effective planning and control. This produces a graphic representation of the programme structure and establishes a framework for all the work to be performed. It also enables assignment of responsibilities, delineation of sub-objectives for monitoring progress and provides a basis for uniform planning and programme visibility. An illustration showing the Work Breakdown Structure in the case of the work (for which a Network Plan is attached in Annexure C2), is given in Annexure B to this Part.

The physical work plan showing the major milestones or activities in broad terms is called the 'Master Control Network' and is prepared for top management. This is illustrated in Annexure C1. The time required activities to perform various with available resources is marked on this Master Control Network. The time to complete an activity for purposes of this Network is arrived at by constructing a 'Doer's' or 'Detailed Network.' After drawing the Networks for appropriate level, the next step is time computations which give the earliest expected and latest allowable times for each event. The Network is then transformed into a Bar chart showing the work packages/cost centres on a time scale. The Bar chart can be drawn directly from the Network by hand computations or computers programmed to print the Network in the form of a Bar chart. After the time schedule for the programme has been depicted on the Bar chart, the estimates of cost for each work-package need to be prepared.

Cost estimates made under the Performance Budgeting system provide the basis for planning and controlling costs of manpower and other resources. These estimates are made by first determining the manpower, material and other resources required to perform each work package (activity or group of activities) on the network schedule. The resource

estimates are then converted into rupees to determine the direct cost of each work package. Indirect costs are added to each work package where such accumulation is possible by existing accounting procedures. All other indirect costs are prorated at summary level of the programme. The cost estimates are marked on the Bar chart and are distributed over a period depending upon the time when it is to occur and also on the procedure to carry out the work package or activity. For example, if material purchase order is placed, and if payments are to be made at different stages, these are considered and marked accordingly on the Bar chart at different periods when payments, fall due. Similarly, if contract for civil works is awarded, then the likely payments to be made, related to the progress of works as shown by the Network, can be worked out and marked on the Bar chart. When these estimated expenditures are added vertically over specific periods of time, say a quarter of one year, it gives the expenditure budget for the project for that quarter. Full year's estimates may also be worked out similarly. In this summation, it may be assumed that all the activities will begin at their Earliest Start Times. One may also elect to make the summation based on Latest Start Times. If these estimated expenditures distributed over time worked out in the two above-mentioned ways are plotted, the two resulting curves will define the range of the feasible budget. Now a particular budget curve lying between these two curves is usually desired. Such a curve may be determined by analysing the Network for activities, which, for one reason or other, should start at some time between Earliest Start Times and Latest Start Times. The Budget curve may then be recomputed on the basis of the scheduled start times worked out on the above lines. The scheduling of the cost based on the Network prepared for the Executive Engineer for the work (attached in Annexure C2) is illustrated in Annexure D to this Part.

In a Performance Budget, a statement showing only the cost phasing is not sufficient. It must be supported by targetted physical progress distributed over periods of time against which actual progress from time to time has to be assessed and reviewed through an information system. The Planning Wing forecasts the progress to be achieved for each work package or activity over a given period of time. For assessing the physical progress on a rational and uniform basis, each component may be sub-divided and appropriate weightages may be assigned, to each of these sub-items. If an item is sub-divided, say, into engineering, procurement and construction, and weightages assigned to these sub-items are 30 per cent, 40 per cent and 30 per cent respectively, and assuming that the component package as a whole contributes financially a proportion of 20 per cent of the entire project, then 50 per cent completion of engineering work under this work package may be assessed as 15 per cent completion of the work package and 3 per cent completion of the overall project. When these physical progress percentages are correlated with estimated expenditure, the Performance Budget assumes operational significance.

The use of network technique has had a significance impact on information systems in recent times. The essential features of an information and reporting system in general and also in relation to the application of Networks has been discussed in detail in Chapter 5 of Part I. As such, they are not dealt with again here. In Part I, suitable formats for reporting on the basis of Networks have also been appended. Pending the development of required competence and necessary preparation for the use of such sophisticated systems, a simple but effective format has been suggested in Part II (Section D) based on milestone charts. These are tentative and may be improved upon and adapted to suit individual situations.

PERT in Relation to Planning, Contracts and Payments

The Network technique needs certain facilities and environment for its successful implementation. These are available or can be created easily in the case of the works which are done departmentally by the CPWD, as all the operations and activities covered by the Network are within the control of the CPWD. In case of contract works, however, the planning and supervision is done by the Department, whereas the actual construction lies in the hands of the contractor. Nevertheless, even in contract works, Network can be used with advantage to control the progress of works. All the investigation and planning activities could be coordinated and scheduled on a Network. The contractor does not come into the picture at this stage. It is at the stage of implementing contracts that difficulties may arise in forcing the contractor to adhere to the sequence of operations and schedules as indicated in the Network. In Chapter 6 of Part I, it has been discussed how it will be useful to the department to have a mutually agreed work plan with the contractor, if possible as part of the contract document, in order to effectively control time and cost elements. In contract works, the contractor should be bound to operate within a pre-determined time schedule in a coordinated sequence. Most of the present problems with the contractors on account of extra/substituted items and deviations resulting in arbitration proceedings, could be largely avoided, if there is proper planning, and what is required to be done is clearly understood and specified on the basis of a work plan which could be translated into a binding contract. The issues here centre around contract clauses and the feasibility of binding the contractors to be mutually worked out Network plan.

The existing contract provisions no doubt, require the contractor to show some proportionate percentage progress. The manner in which he goes about the job is his concern. Forcing him to a Network schedule may present difficulties, even if the contracts are modified. This is particularly so when most of the contractors working with the CPWD are merely money-lenders and have hardly the requisite technical competence to understand and make proper use of a sophisticated technique like the Network. Attempts in this direction should, therefore, start with the training of not only departmental officers but also the contractors and their staff. They have to be gradually inducted into the use and advantages of the technique. As the contractors are the main executing agencies, they must voluntarily and willingly adopt the technique gradually and appreciate its potentialities in their own interest. Unless such a climate is created, Networks prepared will only remain prestige symbols of the organisation where it will be hung. The inertia on the part of contractors to switch over to the network oriented system can be got over by and by, if the Department takes the lead and shows them the way. Profit being the main consideration of a contractor, he will react to new techniques only if he knows that they will save him time and cost. If he doesn't find

it useful, no amount of pressure from the department can force him to accept it. What, therefore, could, perhaps, be done to start with, is for the department to sit with the contractor and work out a logical work schedule indicating the major milestones, dates of start and finish and the overall completion date. These should bind the contractor. On their part, the department should make commitments regarding payments at specified periods on completion of specified stages.

The Network oriented management system pre-supposes adequate planning and quick feed back. If this discipline is not developed, hindrances will upset the entire network scheduling and render it useless. The progress of contract works generally suffers for want of timely decisions and due to delays in the issue of drawings specifications, and materials, etc. They are mostly controllable excepting in a few cases. The endeavour should be to minimise these controllable delays by streamlining the procedures and with a little more discipline on the part of the Department as well as the client ministries.

It is understood that the M.E.S. has been using the Network system for some time now. They have adopted a procedure for preparation of Networks for various levels. The CPWD can, perhaps, study their system with a view to knowing how it is actually operated. As in the case of the M.E.S. Networks could be developed for three different stages, viz. pre-administrative approval planning, detailed planning and execution. A Master Control Network, covering all these stages, could be drawn in the C.E.'s office. Besides this M.C.N., Networks should also be drawn for each of the three stages. The Networks for the pre-administrative approval stage will cover all the activities that are required to be completed till the submission of preliminary estimates. The Network for detailed planning stage should take into account all activities like preparation of detailed architectural and structural drawings, structural designs detailed field surveys and preparation of tender documents. These Networks may be drawn by the 'PERT Coordinating Cell' in the C.E.'s office. As for the third stage, viz., that of execution the Network could be drawn in the S.E.s' office. It would be sufficient if this is done only for bigger works. After the works are awarded the contractor should be asked to prepare the detailed Network as well as labour and material schedules for the work. In this, he may be guided by the E.E./A.E. The role of the department will be restricted to the approval of these schedules to ensure that it fits into the overall plan of works.

Such a detailed Network mutually agreed upon, will form the basis of control. Both the parties should abide by it, though it need not necessarily form part of the contract document, least it should create practical problems every time a deviation occurs. For smaller works, it would be sufficient to work out some logical plan of operation and few material and labour schedules. These could be worked out jointly by E.E./A.E. and the contractor. There is no need of preparing detailed Network for such works.

For the preparation of Networks, their regular updating and periodic appraisals, it will be necessary to have a PERT coordinating cell attached to the C.E.'s offices. The cell should be properly equipped to undertake work of preparation of M.C.N. and Networks for pre-A/A planning and detailed planning. It should also analyse the Network drawn by the contractor in consultation with the E.E. As PERT envisages that appraisal will be continuous, reporting assumes added importance. The decisions and actions taken by E.E./S.E.s. should be communicated to this cell, who should analyse these as regards their progress and cost aspects. Similarly, a cell should function in each circle to deal with Networks at execution stage. As these cells may be handling many Networks at a time, it may not be possible to review them monthly. The reviews may be say at 10 per cent, 25 per cent, 50 per cent, and 90 per cent of the total time for the work. Of course, extra review would be needed when things go awry. Timing of the review could be based on practical experience. For instance, it is generally found that lot of bottlenecks crop up in the early stages of a work and these should be sorted out during the review at 10 per cent of time. At 25 per cent time, the

work normally moves without much difficulty. The 90 per cent of time review is necessary to check the position of payments which may be held up for some reasons.

The potentialities of Network are many and obvious. Its use by management is not dependent on or related to the introduction of performance budgeting. In fact, network technique stands on its own and could be applied irrespective of whether or not performance budgeting is introduced. Network, however, makes possible a meaningful formulation and operation of performance budgets in the case of projects and works by integrating planning and programming with budgeting. Preparation and use of Networks may pose initial problems in the existing set-up. Given the necessary determination, it should not be difficult to adopt this system gradually to all major works as demonstrated by the M.E.S. At any rate, to start with, attempts should be made to develop logical thinking in planning and execution, fully involving the contractors. By listing out the sequence and timing of activities and events, the contractors could be persuaded to adhere to an agreed work plan. This will pave the way for further sophistication in course of time after necessary training is given both to the department staff and the contractors. As stated in Section 3 of this Part, a PERT Co-ordination cell should be created in each zone for the preparation of Networks, guiding the department and for effective follow up action. Both the Master and detailed Networks for the three different stages of work could be drawn in the zone/circle as discussed earlier.

ANNEXURE A

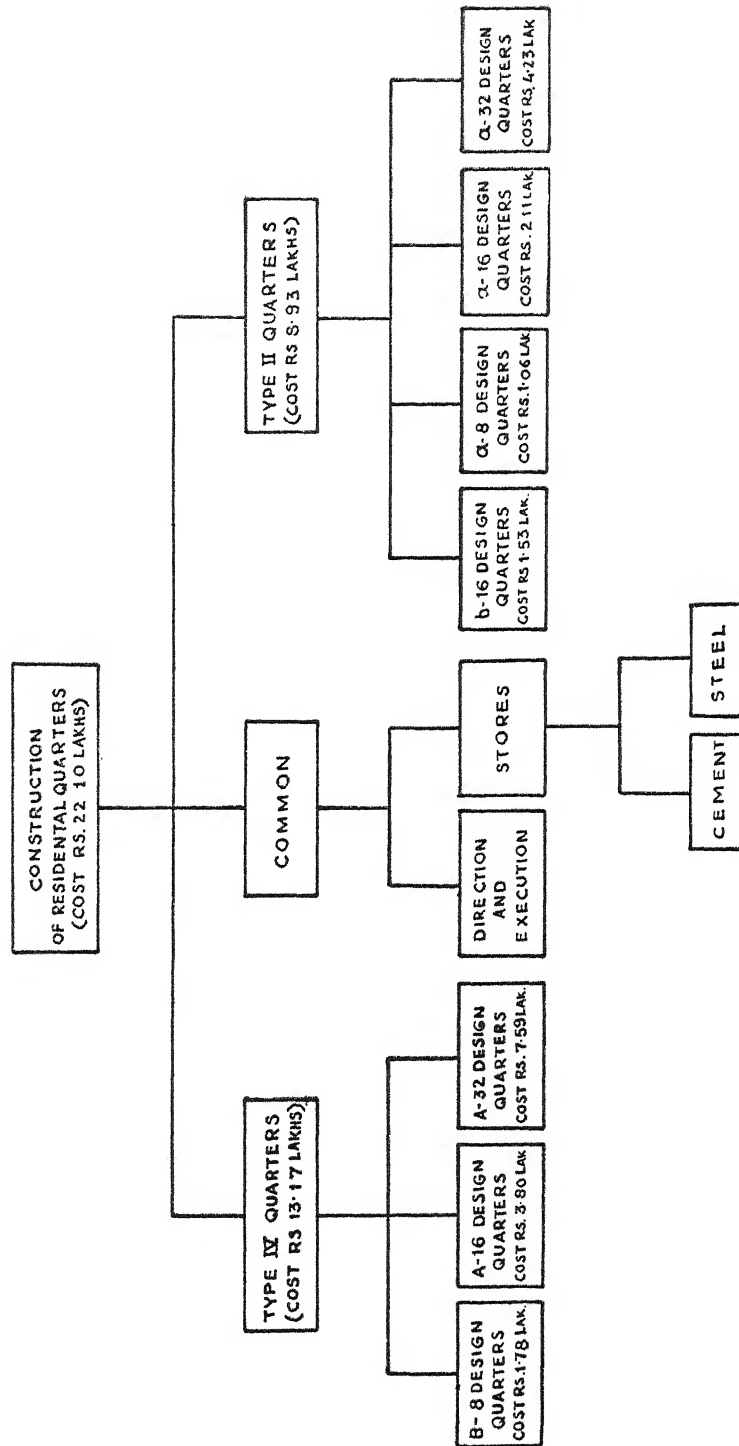
Network Techinque (PERT/CPM)

BIBLIOGRAPHY

1. Project Management & Control:
Finding the Critical Path, Vol. I (\$ 15),
Applied Operational Planning, Vol. II (\$ 15)
Allocating and Scheduling Resources, Vol III (\$ 15) by Dr. R.L. Martin
American Management Association, New York, N.Y. 10020.
2. Project Management with CPM and PERT by Modern and Philips (Reinhold Publishing Company, New York/Chapman and Hall Ltd., London (\$ 8.50)
3. Schedule, Cost & Profit Control with PERT—A comprehensive Guide for Program Management by Robert W. Miller (McGraw Hill Book Company, New York London, 1963 (\$ 8.50).
4. Network Analysis for Planning and Scheduling by A. Batters by (McGraw Hill Book Company/Saint Martin's Press Inc., New York).
5. Project Planning and Control—Simplified Critical Path Analysis by D.C. Robertson (Haywood Books, London, Sh. 35).
6. CPM in construction (The Associated General Contractors of America, Washington D.C. 20006).
7. PERT : A New Management Planning & Control Technique by Gabriel N. Stalion and others (American Management Association, New York).
8. Project Planning & Control in Construction by Turner G. J. (Cassell, London).
9. Project Engineering by Victor G. Hajek (McGraw Hill Book Company, New York, 1965, \$ 8.50)
10. Construction Scheduling and Control by Deathrage George E. (McGraw Hill Book Co., New York).
11. Planning & Control with PERT/CPM by Levin Richard I. (McGraw Hill Book Co., New York).
12. Planning by Network by H. S. Woodgate (Business Publications Ltd., London, 1964, Sh. 55).
13. PERT Implementation Manual—Engineering Master Programme, North American Aviation, Inc. Columbus Division, Columbus 16, Ohio (Engineering Department, September, 1961).
14. General Information Manual : PERT— Dynamic Project Planning and Control Method—I.B.M. Technical Publications Department, 112 East Post Road, white Plains, New York.
15. PERT and Companion Cost System—Director of Management Reports. Office of Programs, National Aeronautics and Space Administration, Washington 25, D.C.

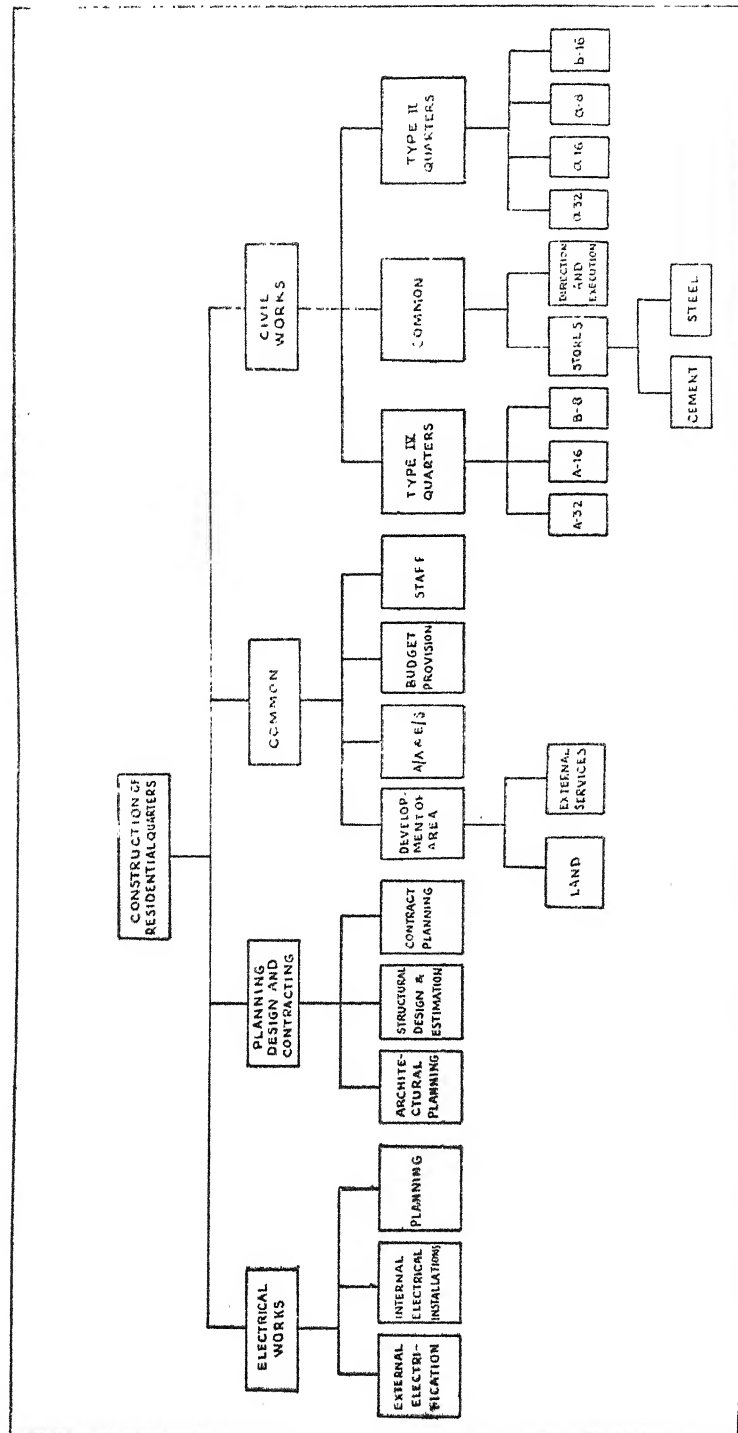
16. PERT Instruction Manual—Minuteman Program, Management Office, U.S.A. (November 28, 1960).
17. Introduction to PERT by Harry F. Evarts (Allyn and Bacon, Inc., Boston, 1964).
18. PERT Instruction Manual and Systems and Procedures for the Programme Evaluation System—U.S. Department of the Navy, Bureau of Naval Weapons, Special Projects Office, Government Printing Office, Washington, 1960.
19. PERT Summary Report, Phases I and II—U.S. Department of Navy, Bureau of Naval Weapons, Special Projects Office, Government Printing Office, Washington, D.C., July 1958.
20. PERT/Time Systems Description Manual—U.S. Air Force Systems Command, Washington, D.C., June 1963.
21. PERT Handbook, National Aeronautics and Space Administration, Washington, D.C., July 1961.
22. PERT Manager Manual by Thomas V. Sobemak (Baldwin, New York, Associates, 1963).
23. A Programmed Introduction to PERT—Federal Electric Corporation (New York, John Wiley & Sons, 1963).
24. A Non-Computer Approach to the Critical Path Method for the Construction Industry by John W. Fondahl, Associate Professor of Civil Engineering, Stanford University, Stanford California.
25. A Manual for Applying the Critical Path Method to Highway Department Engineering and Administration, by Rex M. Whitton, Administrator, United States Bureau of Public Roads.
26. Critical Path Method Program, General Electric Computer Department, Phoenix, Arizona.
27. Progcom Highlights for Project Planning, Scheduling and Control with the G.E. 225, Computer Department, General Electric Co., U.S.A.
28. Management Methods : PERT & CPM by David M. Stries and Maurice M. Murphy, Materials Management Institute, Boston 1962.
29. The PERT/Cost System Design by Management Systems Corporation, Cambridge, Massachusetts.
30. An Introduction to the PERT/COST System by Mr. W.F. Raborn, Vice Admiral, USN, Director, Special Projects, Department of Navy, United States of America.
31. PERT/COST Systems Design, Secretary of Defence and National Aeronautics and Space Administration, DOD and NASA Guide (Washington, Govt. Printing Office, June 1962).
32. NASA PERT and Computation Cost System Handbook, National Aeronautics Space Administration, Washington, D.C. Govt. Printing Office, Oct. 1962.
33. Planning and Scheduling with Network Technique (PERT/CPM). Planning Commission, Manager, Government of India Publications, Delhi.

ANNEXURE B-1
Work Breakdown Structure



ANNEXURE B-2

Programme Breakdown Structure



ANNEXURE D

| CONSTRUCTION OF MISCELLANEOUS QUARTERS AT SECTOR VIII, R.K.PURAM, NEW DELHI. | | | | | | | | | | | | | | |
|--|--------------------|-------------------|---------|---|---|------|---------|------|------|------|---------|------|---|---|
| WORKS PACKAGE | | COST IN LAKHS RS. | 1969-70 | | | | 1970-71 | | | | 1971-72 | | | |
| | | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| T Y P E IV | A - 32 | 7.59 | | | | 0.10 | 0.30 | 0.40 | 1.75 | 2.00 | 2.50 | 0.54 | | |
| | A - 16 | 3.80 | | | | | | | 1.30 | 1.70 | 0.50 | 0.30 | | |
| | B - 8 | 1.78 | | | | | | 0.08 | 0.80 | 0.60 | 0.20 | 0.10 | | |
| | Q - 32 | 4.23 | | | | | | 0.70 | 1.50 | 1.60 | 0.30 | 0.13 | | |
| T Y P E II | b - 16 | 1.53 | | | | | | 0.12 | 0.58 | 0.63 | 0.15 | 0.05 | | |
| | Q - 8 | 1.06 | | | | | | | 0.70 | 0.20 | 0.10 | 0.06 | | |
| | Q - 16 | 2.11 | | | | | | | 0.80 | 1.00 | 0.25 | 0.06 | | |
| | DIRECTION AND D.C. | | | | | | | | | | | | | |
| TOTAL (IN LAKHS RS) | | 22.10 | - | - | - | 0.10 | 0.30 | 1.30 | 7.43 | 7.73 | 4.00 | 1.24 | - | - |

NOTES:- 1. THE COSTS FOR TYPE IV & TYPE II INCLUDE THE COSTS OF MATERIALS

THE PHASING OF COST FOR STORES SHOULD BE SHOWN EXPLICITLY

2. THE DISTRIBUTION OF DEPARTMENTAL CHARGES SHOULD ALSO BE SHOWN

3. THE SCHEDULE IS BASED ON NET WORK ATTACHED IN ANNEXURE C2

NOTES:- 1. THE COSTS FOR TYPE IV & TYPE II INCLUDE THE COSTS OF MATERIALS
 THE PHASING OF COST FOR STORES SHOULD BE SHOWN EXPLICITLY
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 3. THE SCHEDULE IS BASED ON NET WORK ATTACHED IN ANNEXURE C2

PART IV

Summary of Recommendations

PART I

Financial and Administrative Powers and Responsibilities

1. The Engineer-in-Chief of the CPWD should be given full powers on all matters relating to and having a bearing on the speedy and efficient execution of works, for which he is fully accountable. He should be in a position to decide finally on matters relating to the technical aspects of works, such as procurement of stores, machines and T & P, purchase of stationery and materials, contracts, sanction of staff and other items referred to on page 8, either by himself or in consultation with the Works Division of the Ministry of Finance without routing his proposals through the administrative ministry. How he will share his powers and responsibilities with the officers of his department is a matter to be best left to the Engineer-in-Chief. The Ministry should shed its existing powers in this regard.
2. The entire system of delegations within the CPWD needs to be re-examined to make them more purposeful and imaginative, as the existing delegations have not been of such a dimension as to achieve a radical improvement in the operational efficiency.
3. The planning, designing and estimation of the work as a whole should be done by the appropriate authority itself and not split up into sub-heads for being attending to at lower levels with reference to their financial powers.
4. Chief Engineers should be given the power to incur expenditure on initial surveys, watch and ward, etc., pending receipt of expenditure sanction and administrative approval from the administrative ministry.
5. The powers of the Executive Engineers to accord technical sanction to detailed estimates and to accept lowest tenders should be raised to Rs. 2 lakhs or any higher figure considered appropriate.
6. The existing powers of the CPWD officers to accord sanction to extra/substituted items need to be modified as suggested on page 6.
7. The present powers regarding award of additional quantities against abnormally high/low rated items (variations above 25 per cent as compared to the estimated rates) need to be rationalised as discussed on pages 6-7.
8. Differences of opinion between the Chief Technical Examiner and the concerned Chief Engineer should be settled by the Engineer-in-Chief and there is no need for such matters to be referred to the Ministry for a decision.
9. The whole question of approval of government plans by the local bodies needs to be re-examined, as there is considerable delay, avoidable paper work and waste of time,

labour and money under the existing system. Suggestions in this connection made on page 7 are for consideration.

10. One of the causes for the slow progress of works could be removed to a great extent, if the Engineer-in-chief is given full powers on matters relating to procurement and purchase of stores, materials, machinery and equipment. He should also have powers to make alternative arrangements even by way of direct purchases in cases where the firms specified by the D.G.S. &D. fail to fulfil their obligations in time.

Structural and Organisational Aspects

11. The success of performance budgeting depends, among others, on a well organised structure defining specific responsibilities at various levels. There is a need to have a fresh look into the present pattern of responsibilities in the CPWD with a view to re-defining them on a more rational basis. At each level of management, responsibility and authority should be clear and the atmosphere should be such that freedom of action becomes a reality.
12. At the top, it is necessary to suitably integrate the organisation of the CPWD with the Works Division of the Department of Works, Housing and Urban Development by making the Engineer-in-Chief an Additional Secretary to Government. This is essential if a radical improvement in the performance of the Department is to be brought about.
13. CPWD should be closely associated in the formulation of plans at all stages right from the time the proposals are sent to the Planning Commission. The proposal to make the Engineer-in-Chief an Additional Secretary to Government is relevant in this connection.
14. Sanctions to works and issue of administrative approval and expenditure sanction are often delayed by the administrative ministries. Such delays adversely affect planning and execution of works and also result in overall increase in project cost. This is an area that needs immediate attention in the interest of efficient performance.
15. In spite of the recommendations of earlier Study Teams, no concrete steps appear to have been taken to re-organise the work in the division office to enable the E.E. to devote more time on important technical matters and supervision of work without getting lost in accounts and routine administrative work. With the suggestion to post A.S.W./A.E. (Planning) in the divisions (page 12), the latter functions could be shared by the A.S.W. in the manner discussed on page 18.
16. The basic function of the department is proper planning, estimating, formulation of contracts and implementation of the contracts through supervision. The main job of the department is upto pre-contract stage, *i.e.* planning. The organisational structure of the department should be so streamlined that this aspect is duly taken note of.
17. Planning Organisations at each level need to be strengthened. Also, full implementation of the recommendations of the Govinda Reddy Team for bifurcation of quantity surveying and structural planning is still to be done. These functions at the zonal level could be entrusted to a S.S.W. and S.E. (Planning) respectively, each assisted by the required number of S.Ws. and E.Es.(Planning). At the circle level, there could be a S.W. and E.E. (Planning) or only a S.W. depending on the nature of the circle and the workload, to be decided by the Engineer-in-Chief. Similarly, at the divisional level, there should be an A.S.W. and an A.E. (Planning) or only an A.S.W. as determined by the

Engineer-in-Chief on the basis of the nature of the division and workload.

18. In spite of the recommendations of the Govinda Reddy Team that the A.Es. and J.Es. under an E.E. are only executing and supervising agencies in the field, and quantity survey and structural planning are not their legitimate functions, the planning and executive functions are still blurred and the A.Es. and J.Es. are as much involved in these as the E.E. They should be relieved of planning functions which could be done by the A.S.W./A.E. (Planning) in the division.
19. To relieve the E.E. of his burden in respect of arbitrations arising out of contracts, one or more posts of Executive Engineer (Arbitration) may be created under the Superintending Engineers to deal exclusively with arbitration work. The E.E. of the division will feed the E.E. (Arbitration) with data from his files and records and make available all the material needed. It should be for the E-in-C to decide which circles should have special post(s) of E.E. for arbitration keeping in view workload on account of arbitration and other factors. A senior counsel could also be attached to each zone.
20. The extent of supervision required by the E.E./A.E. should vary with the nature and type of contracting agency. The time to be spent on supervision should be on a realistic basis having regard to the importance of the work and the supervision needed. Selective approach on ABC analysis will reduce supervision cost.
21. In respect of works carried out departmentally, problems of procurement of materials, T&P and labour arise. More supervision is also needed. As the codes and procedures are basically meant for contract works, the various aspects of departmental execution need to be examined and a procedure drawn up.
22. The relative roles and functions of the architects and civil engineers in the department have been examined on pages 13, 14, 15. For reasons discussed therein there appears to be no reason for changing the present system of 'leadership' being with the engineers. The architects have an important role in the functioning of the department, and their contribution to the quality of performance lies in making available complete and detailed architectural drawings and plans in time before the work is awarded. No modifications should ordinarily be made during execution, as they may have contractual and financial implications and the zonal Chief Engineer may have to resist the changes if he finds that they cannot be implemented without risking cost escalation or deviations/extra or substituted items involving complications with the contractor.
23. The architects should be enabled to do their job thoroughly without being in a hurry. The question of the inadequacy of top, senior and junior level architects should also be examined by the department in consultation with the Chief Architect, on the basis of work studies.
24. The Department may consider how best the existing training facilities could be improved and extended to cover all categories of officers and staff and in what manner career development and specialisation could be built up. As in the case of other established central services, there should be pre-entry institutional training facilities, both in a central staff college and on the job. Engineers, architects and others should be kept abreast of developments in modern technology and management practices by having periodical refresher courses.

Accounting and Funding

25. Even after the revision of the Account Code in 1963, the accounting system and procedures are still complicated and cumbersome. It is the general feeling in the

Department that the codal provisions require a thorough review again. This may be examined by Government in consultation with the Comptroller and Auditor General.

26. In the context of performance budgeting, there is a need for a fresh look into the needs of account operated by the PWD to bring them along programmes and activities on a functional basis. The work in this regard, as part of the overall accounting reforms, as also the question of funding, is being done by the Team of Officers set up by the Government of India. Their Report is to be awaited.
27. The zone-wise, circle-wise and division-wise allotment of works should be communicated without delay, so that ordinarily no work is taken up without there being a budget provision initially.
28. One of the main defects in the set up, according to the Department, is that the divisional accountants are under the dual control of the Accountant General and the CPWD. Control over their work and conduct proves ineffective under this arrangement. They plead for the accountants being under the exclusive administrative and functional control of the Engineer-in-Chief in the CPWD cadre. The practical implications of such a step may be considered by Government in consultation with the Comptroller and Auditor General.

Information System and Reporting

29. Information and Reporting System in the CPWD should be re-oriented keeping in view certain fundamentals as mentioned on pages 19-20. It should, as far as possible, also be based on appropriate 'Networks' for each work, as and when these are introduced gradually. The deficiencies in the present system as discussed on page 21 should be removed.
30. At the division, a data base should be created and developed for collection and dissemination of data. The data base should process the reports that come from subdivisions and segregate information into two parts—one required for control purpose at higher levels and the other for reporting to the client Ministries/Department. The reporting system should be structured for three distinct levels, viz., E.E., S.E. and C.E. as indicated on page 22.
31. Just as a Data Base is necessary at the divisional level, there should be a distinct Reporting Unit at the circle level and an Information Centre with each zone under the C.E. Reports to clients should go from the Data Base/Unit/Centre of the Division/Circle/Zone depending on the nature of work, level of attention needed and coordination involved.
32. Control by S.E. and C.E. should be on a selective basis applying the principles of ABC analysis and control by exception.

Contracts

33. If the work is to be completed on time, all the participating contractors should do their job to a planned schedule which is integrated with the overall plan of the work. An integrated approach to each contract and the contractor's job is necessary, as any delay in any one item in one contract may affect the overall completion of the work in time.
34. Detailed time schedules on the basis of a work plan should be developed for each contract before the issue of NIT which should include time schedules for completion of significant milestones or stages along with the time for overall completion of the work.

In case of bigger works, the contractor may be required to submit a detailed Network and schedules for labour and materials before starting the work. However, till such time the contractors get used to network technique, the work plan or Network can be drawn by the contractor under the guidance of the department, and in the initial stages, the networks need not also form part of the contract document. The work plan drawn up jointly should be made binding on both the parties. The intermediate payments to be made to the contractor should also be linked with the completion of certain stages of work. These stages could be chosen in a manner that their completion occurs at regular intervals of, say, a month.

35. If the compensation clauses are to be effective, it would be desirable, by and by, to introduce clauses in the contract to determine compensation at some intermediate stages also. There should also be provision for rebate or bonus in case the contractor does the job at a given point earlier than the specified time.
36. The use of L.S. form of contracts as recommended by the Govinda Reddy Team is a matter for Government to consider. Apart from this and the need for studying the forms of contracts in use in other countries, the Department should also consider necessary modifications to the forms in use to effectively bind the contractors to pre-determined time schedules and to bring about the proposed changes.
37. No work should be awarded unless the complete planning is done and detailed drawings and designs are made available. Any changes proposed by the clients should be allowed only upto the time detailed architectural drawings are not finalised. Thereafter, changes should not be entertained, except on strong grounds justified by the head of the client department.
38. As most of the contractors may not be properly organised for the use of refined techniques like PERT/CPM, difficulties in the initial transitional stages may be mitigated by having only elementary aspects of the principle of network and bringing in sophistication gradually. There should be no rigidity in the beginning.
39. It is necessary to examine to what extent frequent and frivolous arbitrations by contractor could be discouraged, as arbitrations take away considerable time of the department. One possible solution is to charge some fee from the contractor on the basis of the monetary value of the claim made. The practical and legal implications of this suggestion, however, need to be examined by government, within the framework of the Arbitration Act.
40. Proper enlistment of competent and financially sound contractors and weeding out of bad or undesirable contractors, are two important aspects regarding contracts. There is a need for a change in the procedure for enlistment and appraisal of contractors on the basis of their technical competence, financial soundness and past performance as outlined on pages 26-27. The method of selective tendering should also be resorted to as in the M.E.S.

Measurement and Payments

41. The present procedure of making and entering measurements in the M.B. and payments to contractors is quite time consuming and cumbersome. It needs to be simplified. On the analogy of L.S. contracts, intermediate payments could be made in the case of item and percentage rate contracts also on the basis of assessment by E.E. of the work done. However, in view of the problems discussed on pages 29-30, what is practicable and feasible is to make only alternate payments on assessment in the manner discussed on pages 30. While making payments on assessment, due note should also be taken of deviations, shortcomings, etc. As the work advances, all the payments during the closing stages of the work may be made only on detailed measurements, including, of

course, final payment. This will save lot of time and botheration all round and also ensure prompt payments. There would also be very little chances of any appreciable overpayment being undetected for a long time as all alternate bills, and all bills, during closing stages, would be paid only after detailed measurements.

42. The Govinda Reddy Team's recommendation (vide para 14.9 of their Report) regarding recording of detailed measurements needs to be implemented early, if not already done. Also, to save time and labour, full nomenclature of items of work need not be written in the M.Bs. in case of running bills.
43. In order that the costs of various programmes and activities do not get mixed up and can be easily separated, it will be necessary to sanction detailed estimates and award contracts, activity-wise. Even if different activities are assigned to one contractor under an agreement, the activities should be kept distinct and in independent parts thereof. This is essential under performance budgeting.
44. Increasing use should be made of calculating machines and other mechanical devices in sections, sub-divisions and divisions to save time and to avoid clerical mistakes in writing of M.Bs., preparation and checking of bills and in various calculations involved.

Check-Measurements and Supervision

45. Supervision should ensure that time and cost factors are controlled and that works are carried out in accordance with detailed architectural and structural drawings, specifications, estimates and contractual obligations. This could be best done by the E.E./A.E. by picking up such crucial and vulnerable areas or units in a work as are important from the point of view of the structural soundness of the work as a whole. In other words, while observing the financial limits laid down in the rules, he should do check-measurement with intelligence and discretion by following the principle of ABC analysis.
46. Important aspects in a work which need greater attention of E.E./A.E. are approval of layouts, issue of architectural and structural drawings and details, approval of materials, their timely supply to contractors as stipulated in the contract, intermediate payments to contractors according to progress of work and sanction of extra/substituted items and their rates, besides adherence to specifications. Delays occur generally for want of proper attention to these areas. Though the Junior Engineer is initially responsible for ensuring adherence to specifications and quality of work, this responsibility is shared by the A.E./E.E. when they do check-measurement. The J.E. can hardly contribute to any other aspect mentioned above. These are to be taken care of by the A.E. and E.E. in efficient supervision of works, besides ensuring adherence to specifications and other details.

Workload Norms and Yardsticks

47. The existing financial norms for workload in divisions need to be looked into afresh to make them more realistic, taking into consideration factors like the location and jurisdiction, nature of execution of works, type of contracts entered into, extent of supervision required, effect on arrears in accounts and records and other related aspects. The norms also need to be revised from time to time at least once in 2 years to take into account increases in cost of labour, material and other inputs and also the increasing complexity of construction and the problems involved.
48. From a study of historical data in representative divisions, it should be possible to work

out norms for staff in normal divisions which should be periodically reviewed. Similarly, the required staff for normal sub-divisions and circles should also be determined. Work studies should be made to determine and specify the output norms for different categories of employees such as engineers, architects, ministerial staff, etc., so that staff requirements could be worked out on some rational yardsticks. When there is a continuous fall in workload in a division, the ministerial staff should either be reduced or the division amalgamated with others, in addition to closing down sub-divisions as is done now. On the same analogy, when there is an increase in workload, not of a temporary nature, along with the creation of new sub-divisions, the staff in the division should also be increased suitably. The same will hold good for circle offices. Fixation of norms is essential to guard against over or under staffing.

49. In fixing the staff norms, detailed work studies may be done by the Department in close coordination with the Staff Inspection Unit of the Ministry of Finance. The Department can thus bring to bear on the work detailed knowledge of the working of the organisation, where as the association of the S.I.U. will ensure objectivity. The results of the study could be discussed in a joint meeting. For this purpose, suitable organisation under the Engineer-in-Chief should be created. The norms should also be periodically reviewed.
50. The existing organisation in the zones needs to be strengthened to undertake a continual revision of the Schedule of Rates and to bring out new editions at least once in two years, so that cost estimates may be more realistic and responsive to trends in tenders.
51. As far as possible, more and more standardisation in drawings, designs and estimates should be achieved in repetitive types of constructions in order to reduce time and labour and to bring about economy in the long run.
52. A major obstacle that the Department faces today in anticipating workload and the corresponding staffing pattern is the uncertainty and delay in the issue of sanction by the client Ministries and the urgency with which works are often required to be carried out without giving the minimum time required for planning and implementation. For efficient and speedy execution of works, it is very necessary that sanctions are given well in advance, without any delay and, if possible, an year or two in advance, so that proper planning for inclusion in next year's budget is possible and priorities decided. It is the broad consensus in the Department, that for proper planning of works and organisation, about three times the annual workload should be on hand always as sanctions. It will also be necessary to fix a time limit for the receipt of sanctions after which the concerned works should not ordinarily be considered in the next year's programme.
53. It appears necessary to look into the reasonableness of departmental charges levied and to re-work out the percentages on a realistic basis both for maintenance as well as construction works. In the case of the former, it will be higher than the latter, where it appears, there is scope for substantial reduction

General

54. Introduction of performance budgeting is not one of mere conversion of the format of the budget into a new classification structure along programmes, activities and projects. Unless the three basic inter-related considerations in developing a performance budget as stated in Annexure II to Part I are given proper recognition and attention, performance budgeting will not be useful as an aid for management.
55. Though a classification structure to meaningfully reflect the objectives and tasks of the

Department could be evolved without much difficulty, much needs to be done in rationalising the organisational structure and centres of responsibility, methods of work, assignment of responsibilities consistent with powers and improving the accounting and reporting system. The success of performance budgeting, as an aid to management depends, however, on how wisely and effectively a budget on performance basis is made use of by management. There should be a built-in- system which will permit periodic appraisals and prompt follow up action

PART III

56. The department should gradually take steps to introduce Network Technique (PERT/ CPM) in as many works as possible. Though network technique stands on its own and has a definite role in scheduling and monitoring resources and progress, it has direct relevance in the development of performance budgets for projects and works, as it facilitates an integration of physical planning and programming with the phasing of outlays and the formulation of budgets. It also makes possible measurement of physical progress in relation to scheduled targets through a meaningful reporting system.
57. The approach to be followed in the introduction of Network Techniques in the CPWD, [the need for drawing Networks at appropriate levels for three distinct stages of work and for creation of PERT coordinating cell at zonal level have been discussed in Chapter 3 of Part III. Attention is particularly drawn to these aspects.